MODEL AIRPLANE NEWS

MAY 1955 — 35 CENTS

MUSTANG SCALE
Nationals Winner

★

BI-GONE
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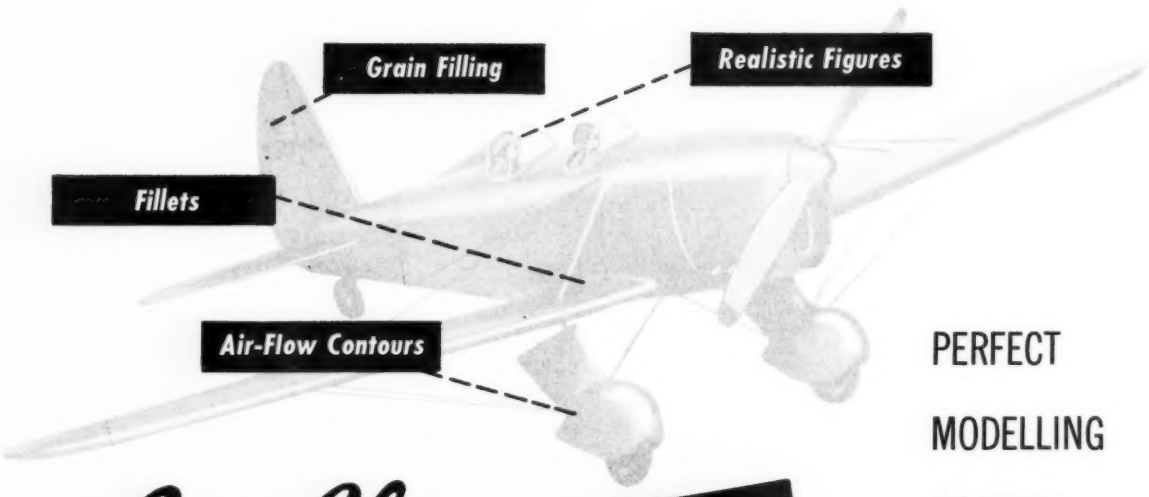

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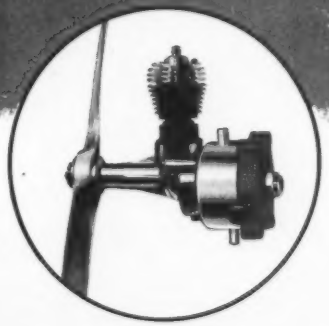

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Pay no premium for peak contest performance and speed! Much more than average ½A power. Generous size stunt tank. Economical on fuel. A smooth-operating engine you've got to fly to believe! **$5.95**

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MODEL AIRPLANE NEWS

26th Year of Publication

MAY 1955 Vol. LII—No. 5

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Printed in U.S.A.

by William Winter

▸ The Fifteenth Model Industry Convention and Trade Show, held recently at the Pantlind Hotel in Grand Rapids, Mich., was, as Hank deBolt put it, "as tough as going to a contest." Fifteen years ago would put the first Show in, let's see, Chicago, and 1940 would be the year that Jim Walker flew one of those new fangled U-control Fireballs all during that year's Nationals. In those days the Trade Show was tied in with the Nats. Today, many don't go to the Nats. From its genesis as an almost all-airplane group, the MIA blossomed out into trains, boats, crafts, and so on, until today the many rows of brilliantly conceived booths are a spectacle to gladden the eye of any hobbyist. All this splendor is for the eyes of trade people only who come to Grand Rapids to see the many newly unveiled kits, engines, boats, cars, accessories; during the evenings, to take part in various section meetings, and talk shop. If you've ever been to an overnight contest, you'll know what this is like.

Our own work began, or ended, when Capital Airlines' Cleveland-bound Connie rose lightly from LaGuardia. You transfer to a local DC-4 for Detroit, Lansing, Grand Rapids and, if you do it the hard way, Chicago. From Cleveland you climb high over Lake Erie. We'd made this hop to an early Detroit Nats, too, only the airline then was called Pennsylvania Central and the planes were Boeing 247's, small ships that required the co-pilot to "soothe" the passengers with hairy tales of really rough weather. The Fort Shelby Hotel used to be contest headquarters, the same hostel that Plymouth used for its Internationals in later years—and that also is history now. Trade Show? Didn't foresighted manufacturers show products then, too? Remember Charlie Brebeck running his OK Twin indoors. Many of today's name manufacturers and exhibitors were young contestants then. Carl Goldberg, Top Flite, was battling it out in indoors with Canada's Harris. (*Continued on page 46*)

PLANE ON THE COVER

Exuberantly zooming into the clear, blue sky, the great Wedell Williams racing plane is imaginatively pictured by MAN cover artist Jo Kotula. Wedell Williams held the land speed plane record, won the Bendix and the Thompson, to leave their indelible mark on aviation. Three machines were built in 1932; by 1934, they took no one's slip stream. But then Jimmy Wedell was killed in a training plane accident when a student reputedly froze the stick. Early "44" had P & W Wasp Junior of 550 hp. The 1934 version, Roscoe Turner up, had 880 hp Wasp. Record, 305 mph.

NEXT MONTH'S COVER

Possibly World War II's greatest fighter, the North American P-51 series Mustangs appeared in many versions, of which the F-51H was the greatest. Over 15,000 Mustangs were built. The last model, built in 1946, had the 1,430 hp Packard-made Rolls Royce Merlin engine, a top speed of 471 mph, and a ceiling of 42,000 feet. Auxiliary drop tanks boosted its range to 2,500 miles.

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NEW! POWERFUL! COMPLETE!

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. . . special for control line flying. Lightweight, oversize fuel tank gives you winning range and power, plus greater output on a power/weight ratio. Mounts flush on the face of your plane. Comes complete with prop, spinner and super-capacity fuel tank. **$4.95**

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Here's a flashy performer with plenty of power for general flying. Has both radial and lug mountings. It's versatile, comes already assembled. Complete with fuel tank, prop and spinner.

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OK CUB .049B Power Kit

KNOW your engine . . . assemble it yourself! Learn your engine from the inside out . . . and save $1.00! Includes all the parts and complete instruction for assembling the Cub. 049B.

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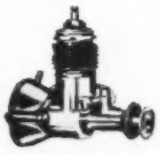
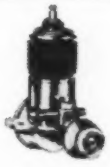
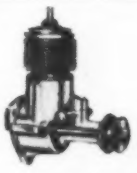


"OK" CUB .049X
$5.75

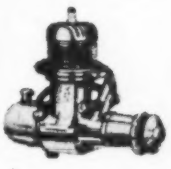
"OK" CUB .074
$5.95



"OK" CUB .099
$6.95



"OK" CUB .14 $7.95
"OK" CUB .19 8.95



"OK" HOTHEAD
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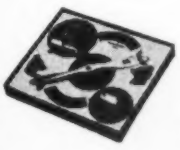
"OK" CUB DIESELS
.049 $5.95
.075 7.50



"OK" COMBINATION PACKAGES

CUB .074..... 6.75
CUB .099..... 7.75

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Never before, anywhere, an authentic scale model PLASTIC boat kit like this! 73 jewel-like pieces, molded in 3 authentic colors, are easily assembled, even by beginners! Kit contains a wealth of authentic detail, from venetian blinds down to specially designed shelf-mounting base. And now . . . another first! . . . Complete with specially engineered parts for power operation—battery box, extra-power rudder and propeller, electric motor mount, shaft and stuffing box, etc. Simple, easy-to-read instruction sheet includes visual directions for assembly and power operation. Ask your dealer!
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Length 14"
BEAM 4⅛"
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*Electric motor not included.
Ready for quick, easy assembly!

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World's LARGEST model boat kit

A RADIO CONTROL FAN'S DREAM! So tremendous, it can support 75 lbs. of added weight! Has over 2 sq. ft. of clear floor space for added equipment installation! Entire cabin instantly removable . . . but need not be removed to start gas engine. Internotched and self-aligning construction. Die-cut African mahogany parts exactly as used on full-sized craft. Die-cut and embossed Gaboon mahogany simulated teak decks. Die-cut balsa frame members, etc. Authentic decals. Yachting Ensign. Venetian blind material. Complete set of portholes. Kit includes two each: shafts, stuffing boxes, rudders, rudder stuffing boxes, also right and left hand nylon propellers, nuts, bolts, etc. Includes a 16-page step-by-step illustrated instruction booklet, plus giant 38" x 50" illustrated plans . . . including power operation and radio control installation. Simplified construction assures fast assembly even for beginners!

Kit B-15M
$24.95

Deluxe 62-pc. Scale Marine Fitting Set B-15F **$8.95**

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Here's the newest RC trainer . . . designed specifically for radio control! Flight tested to insure stability, wind penetration and maneuverability even in high winds! Simple rugged construction insures fast assembly and long life. Highly detailed plans cover every step of construction. Complete with radio installation details and flying instructions!

Kit contains die-cut balsa fuselage sides, wing and stabilizer ribs, rudder, fuselage bulkheads, etc. Structural die-cut plywood bulkheads, wing gussets, etc., to insure maximum strength. Formed landing gear, decals, silkspan, detailed plans, etc.

Kit FS-3, Span 48"
Length 32½"

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For engines from .09 to .19

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Flash News

Many developments push back the air frontier -- this monthly report will keep you in the know.

▼

by JOHN F. RUDY

Air-to-air rocketry schooling is the hottest thing in the Air Force today. The 30-day course, a must for Continental Air Defense Command, is being taught at only two places in the world -- Yuma, Ariz. and at Moody AFB on the edge of the Okefenokee Swamp in Georgia. CADC expects to put 20 of its all-weather fighter-interceptor squadrons through such "thunderbolt geometry" this year -- the F94C Starfires and F-89D Scorpions.

Official title of the new course is "lead collision course firing." It deals with planes traveling at 1,000 ft. per second, launching 2,600-ft. per second rockets, and coming in at right angles on target. The latter are towed at 200 to 400 mph, usually with B-29's in the towing role. Rockets are the Navy-developed 2.75's, the Mighty Mouse. One hit from one rocket will bring down any aircraft in the world. An F-89D carries 104 rockets.

Ramjetting more power to a helicopter rotor for the extra needed to take off or to hover under overloads is now reaching operational success. Marquardt Aircraft of California has developed a boost system. It incorporates a folding scheme allowing the engine to open for operational use at the rotor tip, or to close to a low drag position when inoperative. Advantages claimed are: 1) simplicity -- no changes needed in basic powerplant; 2) weight -- engine itself is hardly heavier than the tip section of the rotor blade it replaces, and 3) fuel -- uses the same as main powerplant, be it piston or turbine.

TWA Meteorologist Ed Farthing may have a brand new way to forecast weather. It's based on daily study of the sun's corona 93-million miles away. More particularly, statistics on emissions of the red and green rays foretell, days in advance, heavy rains in the Midwest and even the cold fronts which tear down with express train speed from Canada. Keep your eye on this new development. All airlines and Weather Bureaus are watching developments.

Snow compacted runways is the latest in Arctic aviation. AF no longer fights the elements -- "we just work with them." A big pulmixer with blow torches softens the snow, churns it together with brush, moss, etc. This makes a 12 in. bed then compacted into a 4 in. runway that can take some of the biggest AF planes.

The guided missiles are coming, in quantity. Full scale production is only around the corner. Technological advances have been incorporated into most designs. This means tooling can start shortly. Spending is headed only one way: up. Look at the estimates: Air Force will spend about $338-million this year on missiles, but two years hence will be up to $603-million. Navy and Marine Corps have big plans, too. Their spending on missiles will rise from about $166-million this year to $414-million two years from now. Over-all totals come to over $1-billion a year at this rate.

An inkling of future defense policy comes from the highest brass. They told MAN that current and future plans will see less buying of airplanes in favor of more spending on the missile program.

$100,000 in prizes! $50,000 of it will be divided soon after the close of TWA's Cosmic Contest, July 31. Wanted: A 30-word sentence on airline service today. The other $50,000 will be paid in 1985 (yep, 30 years away) to the winner or his heirs who submit this year the most accurate description of commercial aviation as it will be in 1985.

Just to get the contestants' ideas "up in the skies," aeronautical leaders are predicting 30 years from now that "traffic volume will be at 500-billion passenger miles annually...helicopters and convertiplanes will be operating intercity services...ramjets will replace rocket motors for airliners...all mail and parcel post will travel by plane.

The contest's easy to enter. Send your entries to MAN and we'll forward them to the man in charge.

Hypersonic tests will be seen more often in the news. It's all because Princeton University has a wind tunnel where speeds can be tested from 700 to 17,000 mph and altitudes from sea level to 150,000-ft. Helium is the working fluid in the wind tunnel, only one of its kind in the world.

How to overcome private flying's biggest booby trap -- the deadly spiral dive -- will probably be answered with Lear's Arcon. It's an aeronautical life preserver to help the non-instrument pilot caught in weather or those on instruments who must fly in foul atmosphere. The electro-mechanical device provides

(cont. on page 52)

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$500,000.00
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	Reg.	SALE
Atwood Cadet .049 glo engine. Ideal for U-Control	$3.95	$2.95
O&R glo plugs for ½A eng. Special, 4 for $1.00	.65	.29
Babcock U-C reel, 6" hard maple w/knobs, guide wires, etc.	1.00	.49
½A engine starter. Pulley type for engines to .099		.15
High grade propellers. Testor's reg. 35¢ to 50¢ each. 8" in 10, 12p; 9" in 10, 12p; 10" in 8, 10p; 11" in 6, 10p		8 for 1.00
Plastic parts boxes with hinged tops, 1¾ x 2¼ x ¾" high	.15	6/.50
DOPE BRUSHES. Fine quality. 20 assorted	3.00	1.00
Souvenir "junk" engines. With broken parts, etc. Sold As-R without guarantee, for your den or desk. 3 for $2.00		.75
Bill Winter's "Model Aircraft Plan Book". 132 pages	1.00	.50
Accessory Kit with foil paper, brush, decal insignia, camouflage colors, sandpaper, scoremarker decals, etc., etc.	1.00	.39
Leather finger guards for engine starting	.25	.15
½A U-Control Wire—35 feet on reel	.35	.20

Planes, Speedboats, etc.

	Reg.	SALE
"Royal Skimmer" speedboat. 13" assembled & painted with fuel proof dope. For ½A engines or electric motors	$5.95	$1.50
Free Flight "Diamond Demon"—48" B	2.95	1.00
U-Control "Tether Sherpia"—18" Class A or B	2.00	1.00
F.F. "Playboy Sr.", famous contest winner, 70½" C or D	6.00	3.50
U-Control "Cleveland Streamliner", twin-boom nacelle type	4.00	2.00
Free Flight "Baby Fleetster" for .020 to .049, 32" span	1.25	.75
U-Control "F-45" prefabbed model for .065 engines	2.95	1.95
"Spitcraft" speedboat, 21" plastic replica of Chris-Craft. Powers with ½A eng. or elec. motors. Prefabbed Kit	7.95	3.95
"Spitcraft" ready to run, complete with $7.95 engine	14.95	8.95
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U-Control "Topper II" for class A-B-C. 16" wingspan	2.25	1.15
U-Control "Topper III" for class B-C. 20" wingspan	3.00	1.50
Free Flight "Jersey Javelin", high wing on built-up fuselage, enclosed landing wheel—48" span, class B	3.95	1.95
U-Control "Aero Puppet" semi-solid model with rodi-carved fuselage. 24" wingspan for Class B-C-D	5.95	2.95
U-Control "Folster DVII" balsa parts, 26½" span for A or B	3.50	1.95
Eagle Micro ½" scale solids — reg. 25¢ each, 5 assorted		.49
F.F. "Lancer", not prefab but loads of fun—32" span	1.00	.60
U-Control "Sopwith Camel" span 28" A-B, printed balsa parts	3.50	1.95
U-Control "Nieuport 17" for A-B engines. Wingspan 27"	3.50	1.95
F.F. "Roamer" A-B, 45" span, tapered wing & rounded fuselage	2.95	1.95
U-Control "Mite Bee" ½A, A or B with 24" span, 20" length	3.50	1.95
"Sports Cruiser" speedboat ready-to-run. Painted 3 color, complete with hi-speed "IMP" motor that runs on 1½ - 3 volt flashlight batteries. 12½" all wood	3.98	1.79
F.F. "Stratospear" w/removable pylon planked fuselage, 42" A	2.95	1.95
F.F. "Racer 8" National contest winner, 53" span C, D	3.95	2.50
F.F. "Racer C" for class C engines. Contest winner, 60"	4.95	2.50
Grab-bag of 6 assorted plastic plane models. All different & including 2 paint colors, cement, brush, stands, etc.		6 for 1.79
F.F. "Baby Zephyr" .020 prefab model with 15" span	.98	.50

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Page	Quantity	Name & Description of Items	Cost Each	Total

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RUSSIAN MIG-15
16" Wing span

Kit 50-2
DEHAVILLAND CHIPMUNK
17" Wing span

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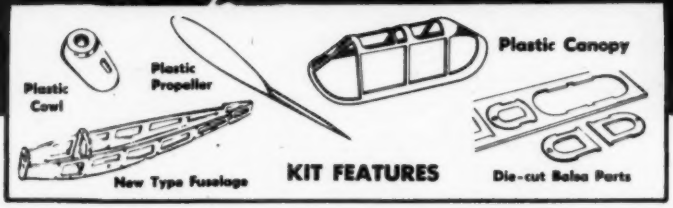
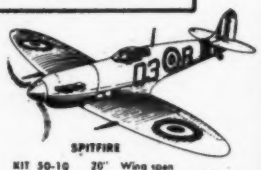
NORTH AMERICAN T-28 TRAINER
Wing span 16"

Kit 50-3
CESSNA L-19 BIRD DOG
18" Wing span



Plastic canopies only furnished in kits 50-1, 50-2, 50-3 and 50-12.

BRITISH SE-5
KIT 50-4 20" Wing span


SPITFIRE
KIT 50-10 20" Wing span

CESSNA
KIT 50-3 18" Wing span

HAWKER HURRICANE
KIT 50-9 20" Wing span

MONOCOUPE
KIT 50-7 20" Wing span

AERONCA CHAMPION
KIT 50-8 20" Wing span

VOUGHT CORSAIR
KIT 50-11 20" Wing span

WACO CUSTOM
KIT 50-6 24" Wing span

If not available at your Hobby Dealer send direct to factory adding 25¢ packing and postage in U.S.A., 40¢ outside U.S.A.

PAUL K. GUILLOW Inc.
WAKEFIELD MASS.

Guillow Salutes...

CAPT. "EDDIE" RICKENBACKER

America's Ace of Aces of World War I, Eddie Rickenbacker, was commander of the 94th Aero Squadron in France. He is credited with downing 26 German aircraft and for his heroism was awarded the Congressional Medal of Honor, the Croix de Guerre, and numerous other decorations. He returned from the war with the rank of captain and in 1938 became president and general manager of Eastern Air Lines. He is now Chairman of the Board.

Under his leadership, Eastern became the first airline to reach subsidy-free status, and has never had an unprofitable year.

In World War II he visited various theatres of operations on special missions for the Secretary of War. On one of these trips his plane crashed in the Pacific and he and the crew were cast adrift 23 days before being rescued. A book, "Seven Came Through" is his story of this epic ordeal.

A NATIONALS WINNER

The Mustang ★

Months of study of the real aircraft went into the author's preparation of working drawings. Formerly Junior Nats winner, he now tops Senior.

Cowl separation lines of big Mustang followed—bottom cowl removes. Engine is positioned so that exhaust comes through scale position opening.

Stock wheels, spinner, tail wheel, all within .02 of scale. National insignia decals to scale. Radiant Decalcomania stars and bars also scale.

Cockpit canopy sliding on music wire rails is typical of exceptional detail—that small lettering is scale, too, incidentally. All described.

by JIMMIE McCROSKEY

Most authentic scale model ever presented anywhere, this F-51H proved its flying ability in the wind when it won its event at 1954 Nationals.

The Mustang came into being almost overnight. While most World War II fighters took months of designing and testing to develop, the first Mustang rolled out of the plant just 120 days after North American Aviation boasted to the British that they could produce a pursuit plane superior to anything in the skies at that time. Designed for the RAF in 1940, Mustang I and II models, powered by 1,000 hp Allison engines, wrecked Nazi ground installations and supply lines with their low level bombing and strafing attacks. These aircraft, with a top speed of 375 mph, were the first single-engine planes based in England to penetrate Germany, where they gave the Luftwaffe plenty of static.

Soon 1,325 hp A-36 dive bomber versions from the United States were hammering at the Axis in Africa and Italy, while 1,150 hp F-51's and 1,200 hp F-51A's destroyed Zeros in Asia at the rate of 10 to 1. Maximum speed for the F-51A was 415 mph.

In December, 1943, 450 mph F-51B's and C's powered by 1,385 hp Packard-built Rolls Royce Merlin engines began long range escort hops and proved a consistent master for Luftwaffe interceptors. The new Merlins, with two-stage superchargers, increased effective fighting ceilings from 15,000 to 40,000 ft. With the addition of still more power and a bubble canopy for increased visibility, the F-51D began its history-making career. This was the most famous of the Mustangs and 9,603 were built. Of these, 1,337 were equipped with Aeroproducts propellers and were redesignated as F-51K's.

Last in the Mustang series is the completely redesigned and vastly improved F-51H. Only the atom bomb prevented it from seeing active combat. Powered by a 1,430 hp Merlin V-1650-9, it has a top speed of 471 mph, a ceiling of 42,000

181st FIGHTER BOMBER SQUADRON
TEXAS AIR NATIONAL GUARD
HENSLEY FIELD

P. O. BOX 665 GRAND PRAIRIE, TEXAS

To Whom It May Concern:

This model was patterned from F-51H, 44-64366 that was assigned to the 181st Fighter Bomber Squadron, Texas Air National Guard, Hensley Field, Dallas Texas.

The markings on the model are identical to those on the actual aircraft.

(signed)

DOUGLASS N. PRESLEY
Major, AF, Tex-ANG
Commander, 136th Ftr
Bmr Group

NORTH AMERICAN AVIATION, INC.

Jimmie McCroskey
Box 38
Iredell, Texas

Dear Mr. McCroskey,

Replying to your letter of November 20th which included your drawings of the F-51H. We have had our engineers check the drawing, which we return herewith, and find it without error.

Your article has been read with great interest and also find it satisfactory and well written.

Your intense interest in aviation gives us the thought that our future and belief in the younger generation has not been disillusioned.

Our best regards to you in your field of future aviation.

Sincerely yours,

(signed)

James W. Carey
News Bureau Manager

jwc:rg.

ft. and a range of 1,230 miles, increased to 2,500 miles by auxiliary drop tanks. Design weight was 9,484 lb., but six rockets and a 2,000 lb. bomb load, in addition to standard armament of six 50-calibre machine guns, increased the maximum gross weight to 12,400 lb. Span is 37 ft. 5/16 in.; length, 33 ft. 4 in.; height, 13 ft. 8 in.; and wing area, 235 sq. ft. At $54,476 each, 553 F-51H airplanes were built. A total of 15,485 Mustangs were produced from August, 1941 to September, 1945.

The F-51's performance, which has kept it alive even in the jet age, can largely be attributed to its revolutionary low drag, laminar-flow airfoil; its unique cooling system that produces no net drag; and its streamlined fuselage, plotted with second degree curves.

One of the highest honors accorded to the Mustang was its rating in 1944 by a Senate Investigating Committee as "the most aerodynamically perfect pursuit plane in existence."

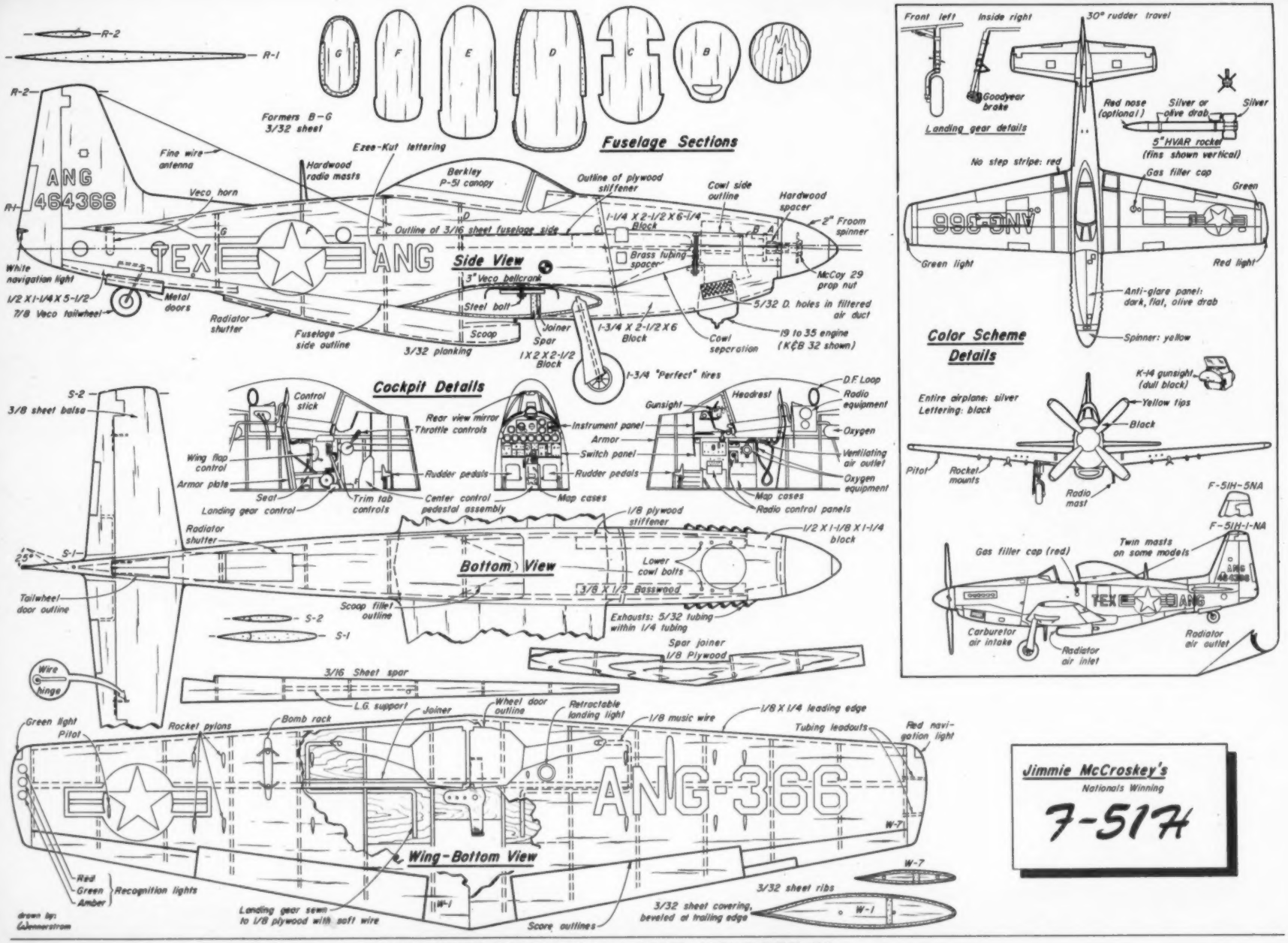
Before describing the model, grateful acknowledgement is due North American Aviation, Inc., the 136th Fighter Bomber Group, Texas Air National Guard, and E. R. Atkins, Jr. for their cooperation and assistance.

The model is built to the scale of 5/6 in. equals 1 ft. in order to accommodate commercial wheels, spinner and national insignia decals. Perfect 1-3/4 in. wheels, a Froom 2 in. spinner, and a Veco 7/8 in. tailwheel are all within .02 in. of exact scale. Radiant Decalcomania Co. (56 W. Washington St., Chicago 2), makes stars and bars that are the right size. The markings and details are copied from the F-51H-5NA, 44-64366, assigned to the 181st Fighter Bomber Squadron of the Texas Air National Guard. Lettering appropriate for your own state's ANG or regular USAF markings may be substituted. The plans have been approved by North American and should be accurate enough to satisfy the most rabid scale fan.

A well-worn K & B .32 with an intake restrictor powered the original 39 oz. model at a speed of about 70 mph, enabling flights to be made in windy weather. Almost any reliable engine of .19 to .35 displacement may be substituted. One of the most important things to remember in competitive flying scale is that *you have to fly to win*, in wind as well as calm. An engine that can be depended on to start easily and run steadily throughout the entire flight is an absolute necessity. A dependable fuel system is important, too. Many beautiful models fail to win in contests simply because they fail to fly, or fly long enough to qualify. Flying Scale is two words; the former is not to be forgotten.

Begin construction by cutting the 1/8 in. plywood stiffeners to shape. Drill the 3/8 in. by (*Continued on page 37*)

Many an hour was spent by the author in the cockpit of the real Mustang in this picture. He did change that C to T—for he's Texan, of course!



Jimmie McCroskey's
Nationals Winning
7-517H

FULL SIZE PLANS AVAILABLE. SEE PAGE 46.

AIR WAYS

Maybe there isn't much flying this time of year but, brother, there's plenty of building.

When C. McCutchen, Princeton, N. J., took this "flying machine" to British Nats, eyes popped. Stable, power or no. He's nuclear physics student.

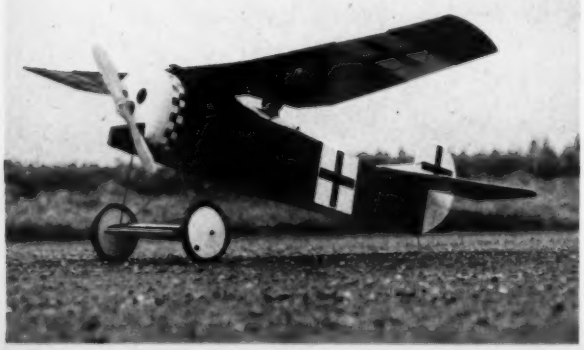
Heh, fellows, over here! Realistic flight shot of John Stafford's Mills .75 Tiger Moth scale job, made by Mick Graham, using telescopic lens.

No card table project, Al Brigg's aluminum-covered Avro Lincoln spans 92 in., weighs 15 pounds. Briggs also built big Avro Lancaster and B-17.

RC Fokker D-8, scaled up from January '52 MAN, by Ellis Sigmon of Everett, Wash., spans only 40 in. and is powered by an .075 Cub Diesel.

Though MAN readers have rebuilt number of historic crates, this all new Bleriot, S. N. Green, Calgary, Can., flies well on modern engine, prop.

Two big problems has Cliff Fox, S. Williamsport, Pa. Flying circles aren't big enough for this stunter. Takes $20 for color dope—mere detail.

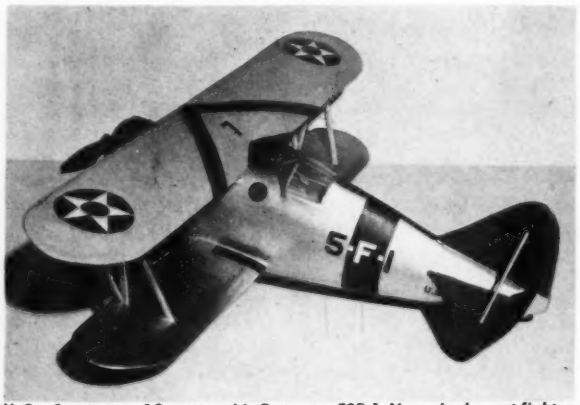


Top four pictures, flying scale jobs, Seattle Skyhawks: Above is Chuck Wood's winning Great Lakes. Painted orange and black; power, .074.

Travel Air monoplane by Lee Ray, another entrant at Skyhawks' scale meet. Enlarged from Nieto MAN drawings. Orange and black coloring.

Easy-to-look-at Fairchild 24 is the handiwork of Bob Findlay. Powered by .035 Torp. Most flying scales are either overpowered or on small side.

Lee Ray makes hay with Nieto drawings—this one an Eaglerock biplane enlarged from magazine plans. Took second place, Skyhawks' scale meet.



McCoy Sportsman .19 powers this Grumman F2F-1, Navy single-seat fighter of the 'thirties, by James Fitch, Naval Air Station, Patuxtent River, Md.

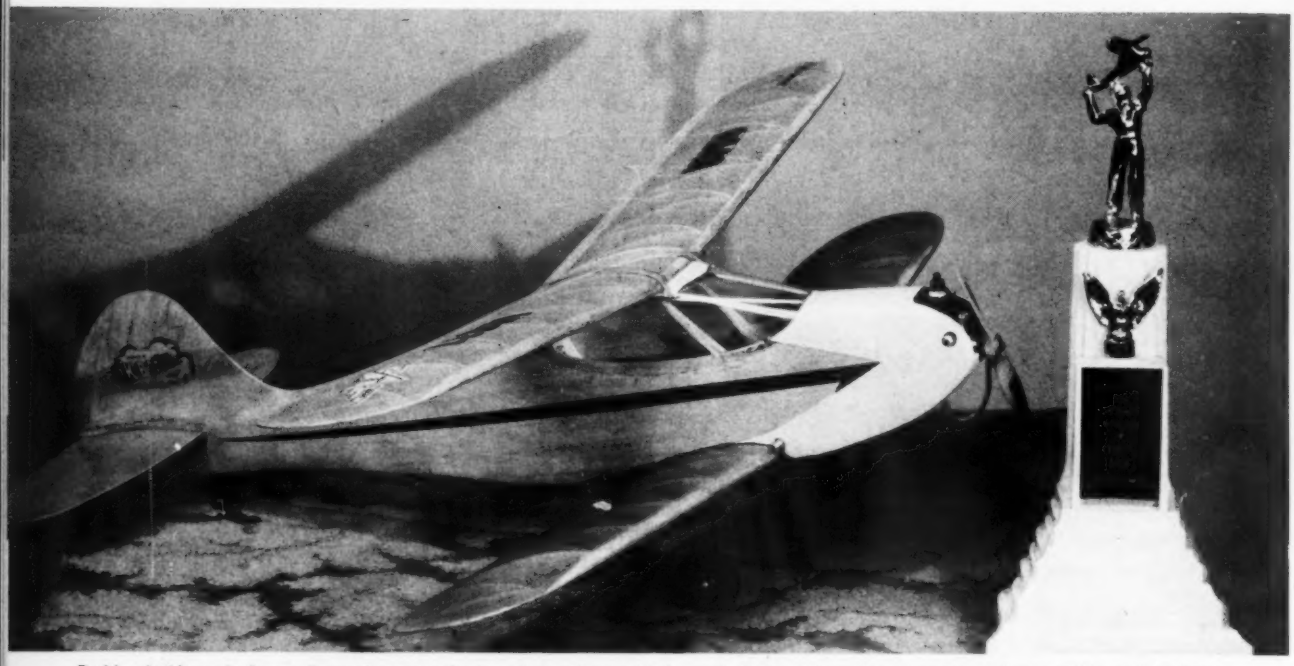
Scale builder Dick Enos, Las Vegas, Nev., came up with another superb controlliner. This time Fokker Dr-1 from Nieto drawings. Prop is scale.

Modified MEW 307 pulse jet powered this speed job by Norman Turner, Washburne Trade School Gas Model Club, Chicago. Was timed at 128.01.

All controls work from cockpit, in Enos' tripe. Cowl hammered from metal water tumbler, finished on lathe. Landing gear, skid, shock absorbing.

Bi-Gone • • •

It took more than luck for this clever little biplane to beat all the Half-A contest jobs at Jim Walker's Northwest Championships. And we're right proud to publish it.



Positive incidence in lower, forward staggered wing, first stalls out lift forward of CG. This makes plane tremendously stable, stall resistant.

by VERN CLEMENTS

▶ This biplane won first place in Half-A free flight at the Jim Walker Northwest Championships. Contest performance was not in mind when this ship was on the board. It was designed with the intention of being an everyday sport flier. It logged many hours in the air just cruising around in an enjoyable realistic manner powered by a K & B .035. The flying time piled up until the .035 was worn out. An .049 was then installed which resulted in a hot spiral climb indicating that a realistic design is capable of contest performance. After reaching high altitude, Bi-Gone demonstrated numerous times its ability to spiral tightly in a thermal even though non-thermal glide performance is not a floating glide. Idaho modelers were aware of this ship's ability to find thermals at a recent sport flying session where Bi-Gone caught more thermals than any other ship flown during the day, one of these flights being over 45 minutes.

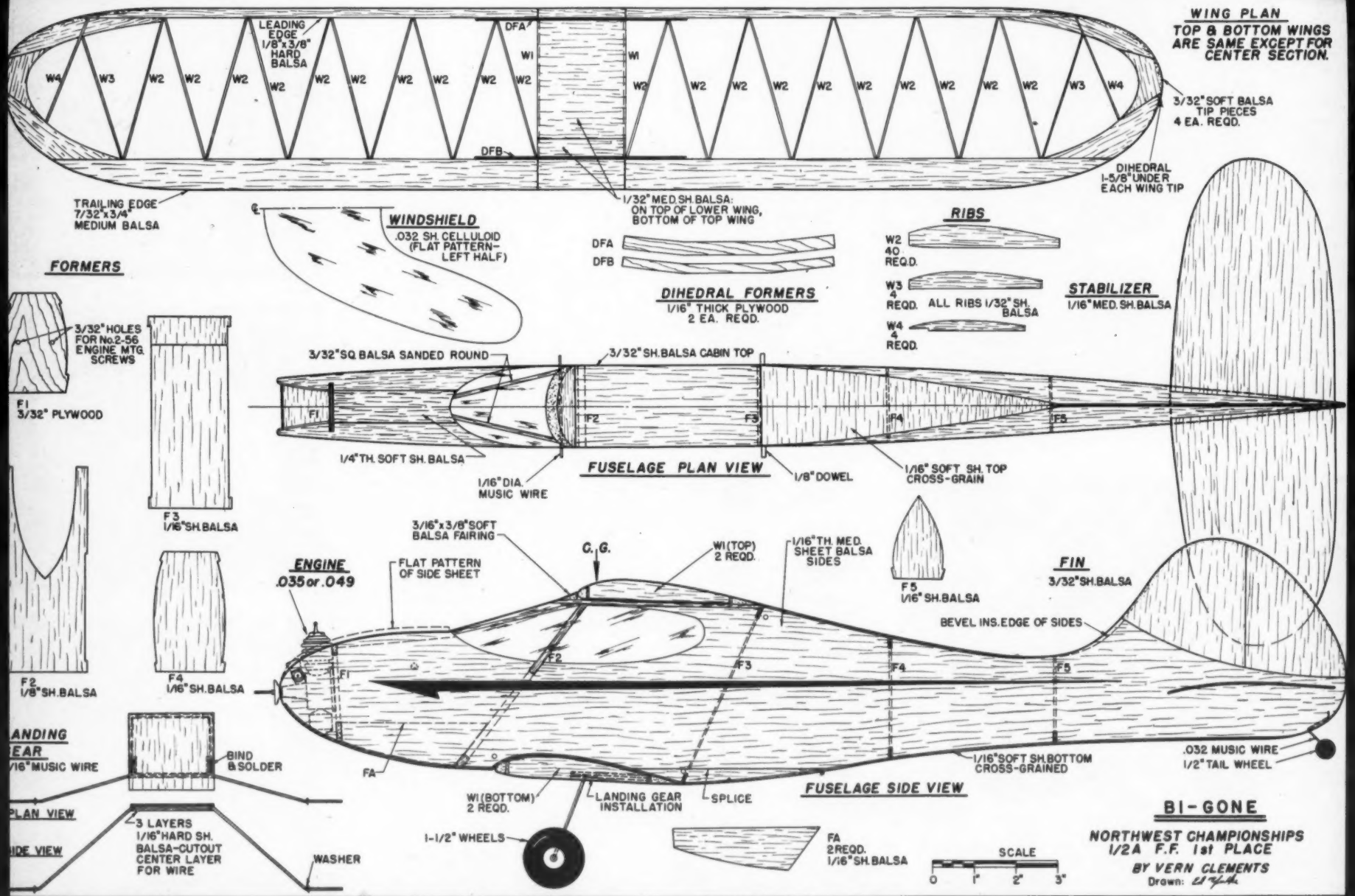
Bi-Gone was quite out of place at the Northwest Championships (with very few bipes seen at contests) and received many looks of astonishment from the modelers as it spiraled up at high speed with a snap recovery into a smooth glide path. Could it be that biplanes are not supposed to perform that well?

The main asset of this model is its consistent performance. Its geodetic wing ribs result in warp-free wing surfaces. The tail is cemented permanently in place so there is no chance of its getting bumped out of adjustment.

Your model should be constructed of lightweight (*Continued on page 36*)

Vern Clements, his thermal riding bipe.

Sheet balsa construction fairs in beautifully to take the fin. Both wings knock off in crack-ups.



FULL SIZE PLANS AVAILABLE. SEE PAGE 46.

Hello there, young man! Bet you find those booster battery plug-in leads a help. You don't say! The switch stops burned out plugs? Shorts, too?

Tray holds as many small things as a woman's pocketbook—well, almost. Remove tray to reach fuel cans and bats. Ukie fans can hang reel on end.

Field Box

Are you a pack horse? Why get rounded shoulders or baggy pockets when all you need is this nifty box? Easy to make, holds all—except the plane!

By H. A. WILLIAMSON

Is there anything more frustrating than playing "pack horse" every time a flying session is scheduled? With booster batteries under your arm, a pint of fuel slowly leaking into your hip pocket and a flock of props jabbing into some tender part of the anatomy, how could any modeler really appreciate an afternoon on the field? Then, after day is done, repeat the same frantic juggling act, arriving home tired, hungry and almost convinced that the day really wasn't worth all the effort the preparations required.

Naturally, all of you "fly boys" don't go through a discouraging situation like the one mentioned above. Some fellows we know, arrive at the local cow pasture beautifully equipped, with a place for everything and everything in its place. Of course, they need (and have) a snazzy station wagon to transport it all (lucky guys!). For those who have experienced similar situations and for those poor souls who always arrive at the field only to find that they have left some indispensable piece of their equipment at home, we offer this article as a step toward solving their problems.

Now, we don't guarantee that this tool box is a panacea! It won't hold everything you own (in most cases) and it will not prevent *all* lapses of memory! We arrived at a contest one Sunday, after driving a couple of hundred miles, only to find that all the wings for our free flight ships were home! For problems like this a psychiatrist should be consulted.

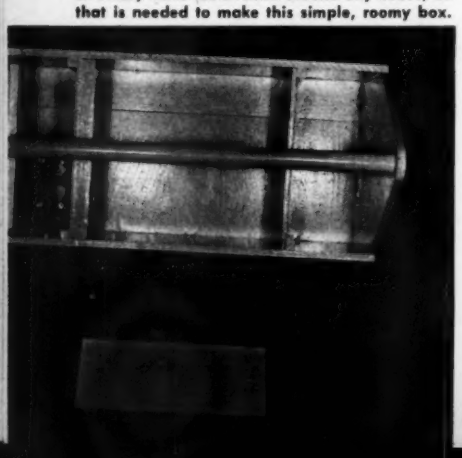
This box was designed to fulfil the needs of the average modeler and to carry the run-of-the-mill equipment every guy needs and has; its construction needs nothing but the ordinary hand tools found around everybody's house.

It may be readily seen in the photos and drawings that there is a compartment for fuel cans (up to quart size) and a closed compartment that will hold four dry cell booster batteries. Incidentally, either dry cells or a 2 volt wet cell battery may be used. Between these two compartments there is a large open space, big enough for scads of props, engine rags, etc.

The drawer at the bottom may be divided as shown, to keep all the smaller tools and parts in a neat, orderly arrangement without cramming. Knives, cement, glow plugs, prop wrench, screw drivers, and so on, fit very nicely into its maw and are always handy when needed.

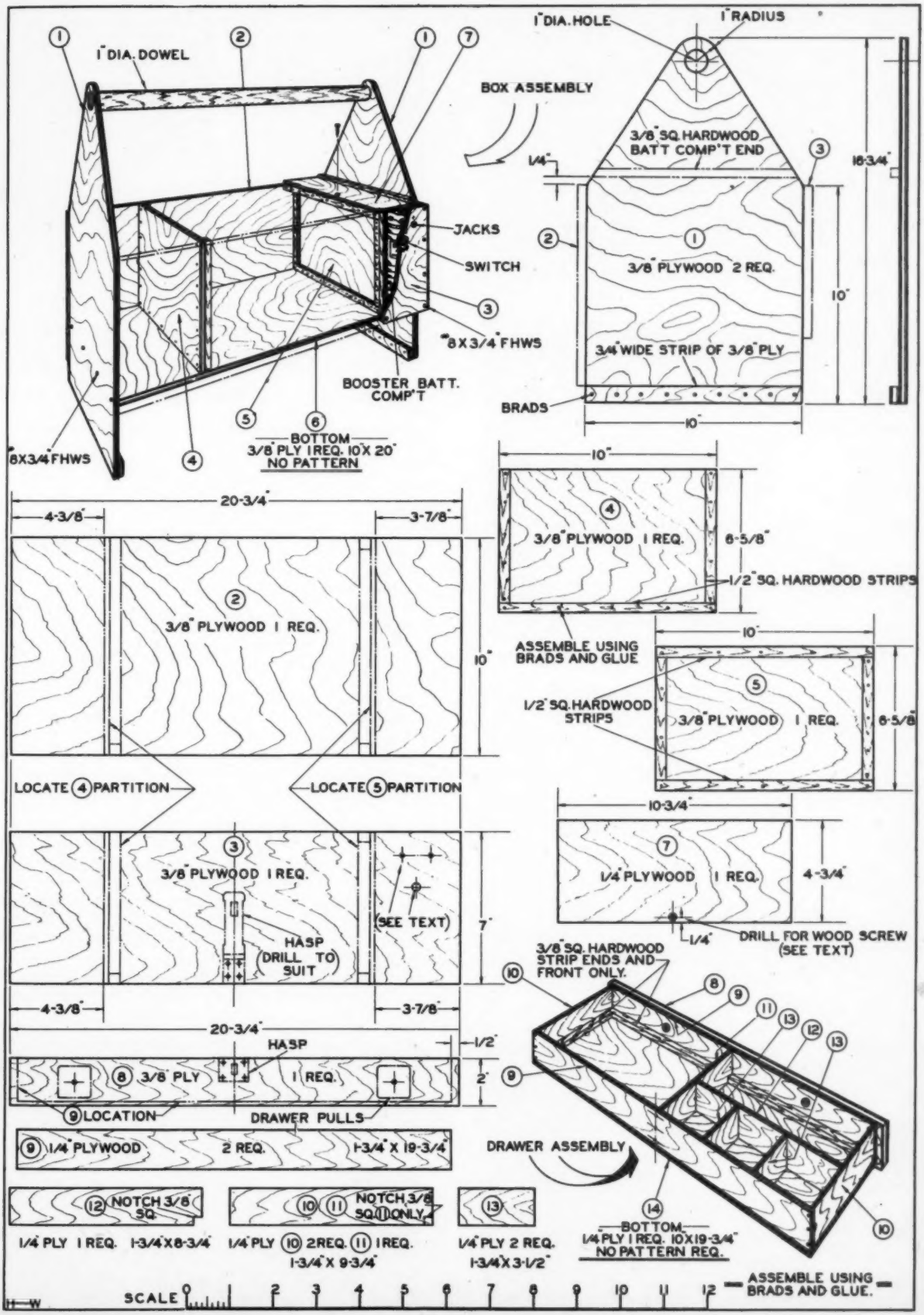
You may have noticed, by now, that the ends of this box actually function like legs to keep the bottom of the drawer off the ground, at the same time (*Continued on page* 48)

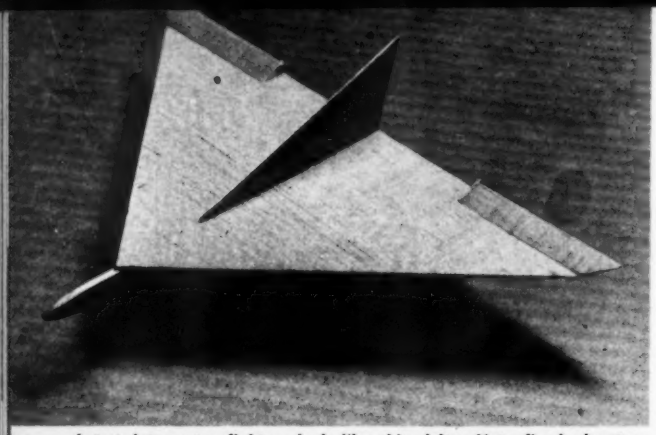
Ordinary hand tools found around any house, all that is needed to make this simple, roomy box.



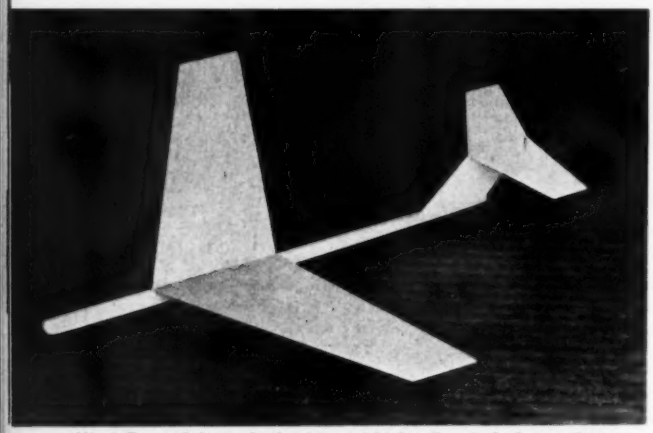
And it doesn't just sit on the ground; the bottom raised. Compare with drawings, opposite.

This thing could make magazine rack, so be careful! Finish with good, hot fuelproof enamel.

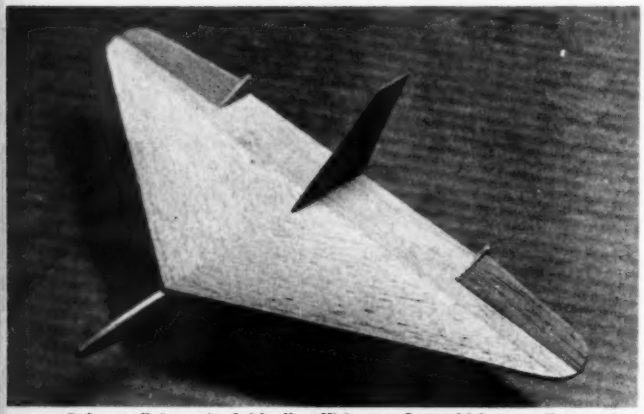

1" DIA. DOWEL
1" DIA. HOLE
1" RADIUS
BOX ASSEMBLY
3/8" SQ. HARDWOOD BATT COMP'T END
1/4"
18-3/4"
JACKS
SWITCH
3/8" PLYWOOD 2 REQ.
10"
3/4" WIDE STRIP OF 3/8" PLY
8X3/4 FHWS
BOOSTER BATT. COMP'T
BRADS
10"
BOTTOM 3/8 PLY 1 REQ. 10" X 20" NO PATTERN
8X3/4 FHWS
10"
20-3/4"
4-3/8"
3-7/8"
3/8" PLYWOOD 1 REQ.
6-5/8"
1/2" SQ. HARDWOOD STRIPS
ASSEMBLE USING BRADS AND GLUE
1/2" SQ. HARDWOOD STRIPS
3/8" PLYWOOD 1 REQ.
LOCATE (4) PARTITION
LOCATE (5) PARTITION
10-3/4"
1/4" PLYWOOD 1 REQ.
4-3/4"
1/4"
DRILL FOR WOOD SCREW (SEE TEXT)
3/8" PLYWOOD 1 REQ.
(SEE TEXT)
HASP (DRILL TO SUIT
7"
3/8" SQ. HARDWOOD STRIP ENDS AND FRONT ONLY.
HASP
1/2"
8 3/8 PLY 1 REQ.
2"
9 LOCATION
DRAWER PULLS
9 1/4" PLYWOOD 2 REQ. 1-3/4" X 19-3/4"
DRAWER ASSEMBLY
12 NOTCH 3/8 SQ.
10 11 NOTCH 3/8 SQ. (11) ONLY
13
1/4 PLY 1 REQ. 1-3/4 X 8-3/4
1/4 PLY (10) 2 REQ. (11) 1 REQ. 1-3/4 X 9-3/4
1/4 PLY 2 REQ. 1-3/4 X 3-1/2
14
BOTTOM 1/4 PLY 1 REQ. 10 X 19-3/4 NO PATTERN REQ.
SCALE 0 1 2 3 4 5 6 7 8 9 10 11 12
ASSEMBLE USING BRADS AND GLUE.



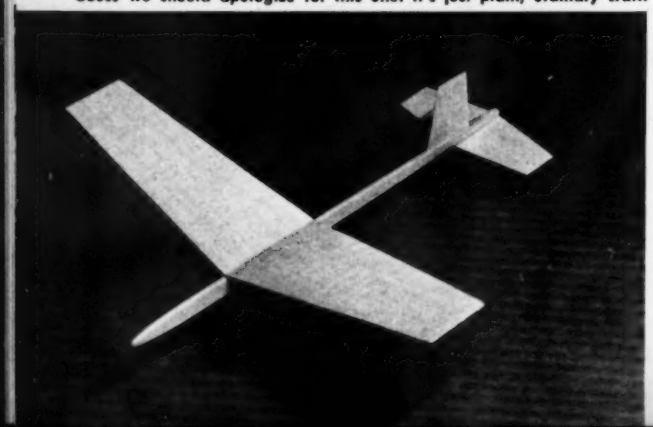
Latest interceptor fighters look like this delta. Note fixed elevators.



Mig influence? Swept-back wing and high tail typical of many jet types.



Delta or flying wing? Ideally efficient craft would be true flying wing. Guess we should apologize for this one. It's just plain, ordinary craft.



Gliders Five...

by JOHN ZAIC

Today's beginner demands more, gets less than ever before. In response to teacher, also beginner requests, MAN had designed a simple glider series. Fun to build, they show wood cutting, sanding and illustrate modern plane types.

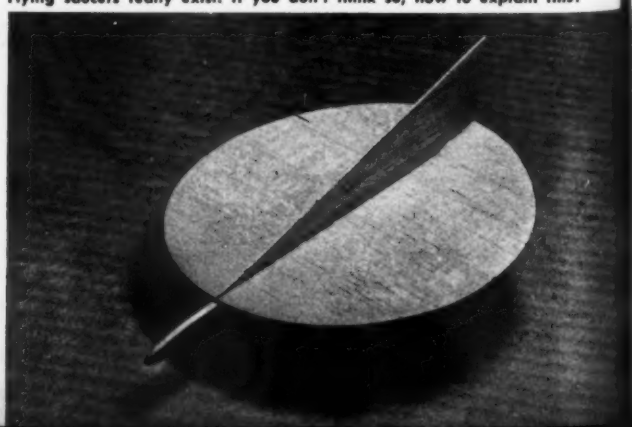
Here are five little gliders that can be flown in any room. They are for the pleasure of anyone, the expert or non-expert model builder. Craft teachers, den mothers and others will find them suitable as a project for their classes. Although the gliders may look different from each other, they all follow the same principles of flight and demonstrate types of modern aircraft.

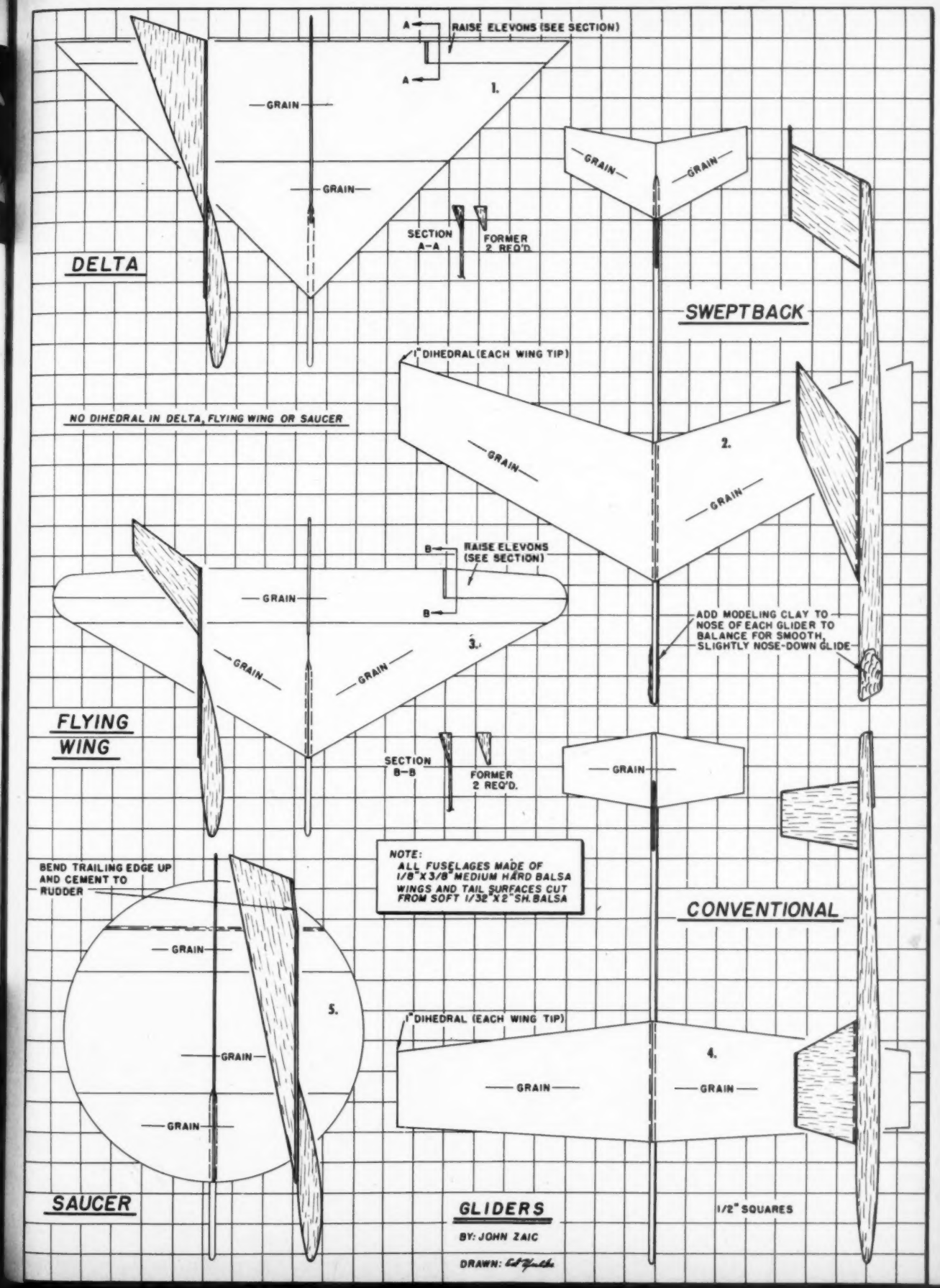
The planes on the opposite page are drawn half-scale. Full size plans, including step-by-step directions, are available. Those in a hurry can connect the handy grid marks from border to border. These marks are 1/4 in. apart. Prepare a drawing exactly twice the border dimensions given, measure off new grid marks on the big drawing, then connect these marks as before. By counting squares and fractions of squares on the small plan, then transferring the measurements to the big drawing, full size outlines can be developed.

A single-edged safety razor, a 12 in. ruler and 00 sandpaper are all the tools required. To protect the point of the razor, a piece of cardboard is placed underneath the balsa that is cut. When the point of a razor is dull, it will be difficult to cut cleanly. It is not necessary to press hard on the razor blade when cutting balsa and several light passes, instead of one heavy stroke, serve better. A 12 in. ruler is used to guide the razor in making straight cuts. A metal ruler is especially suited to the purpose.

Cut out each part and sand with very light strokes. Bend up the edges of the sandpaper or (*Continued on page* 42)

Flying saucers really exist. If you don't think so, how to explain this?





FULL SIZE PLANS AVAILABLE. SEE PAGE 46.

The very latest thing in test facilities. To avoid possible confusion, private capital paid for this facility. It is not government-owned.

Odd-looking free flight skims along, its mighty .049 putting out some 6-1/2 ounces of thrust. Duct and fan design; also orifices, most important.

Close-up of controlline Lockheed fighter from the author's collection shows some interesting deal on a carved wood fan and the installation.

ALL ABOUT JETS

PART TWO

▼

Continuing this most authoritative series of articles on reaction propulsion as related to practical models is this discussion of types of engines and what to expect from them.

By ROBERT T. DeVAULT

Introduction

In the first article we discussed full scale engines and talked about jet propulsion in general. This time we're going to cover the model jet engine field, showing what types of engines are practical, and what performance can be expected from each type. Next month we'll narrow the field down still more and discuss one particular type of model jet engine: the ducted fan. The ducted fan engine is a promising one for model builders, but its promises don't mean anything unless you speak its language. These articles are a sort of language course.

Maybe we should start this article with a question: Why do we want jet propulsion for models, anyway? Aren't propellers good enough? If we mean, "Don't propellers have good enough performance?" the answer is yes, certainly propellers have good performance. But whoever saw an F-86 with a prop on the nose? This, simple as it is, is the whole point. We want our models to fool us, to make us believe that we own and control the real thing. We want them to look the same, sound the same and perform the same. It seems that we can't be satisfied in all respects, but we can come pretty close if we make the effort.

Model jet propulsion brings with it many new problems. For some reason new problems never seem to stop the model builders, though, and jet propulsion is going to be developed in a practical manner for models as sure as you're reading this. So far models have taught us a lot about aerodynamics, structures, engines and even radio control. Now it is going to teach us more about the basic principles of physics and fluid flow.

In last month's article we described the full scale propulsion systems in common use: propeller engines, rockets, ramjets, pulsejets, turbojets and ducted fans (sometimes called bypass engines). Some of these types are available to modelers and are quite satisfactory if used properly. We don't have any model ramjets or model turbojets, though, and we probably never will. A model turbojet, say 6 in. or less in diameter, would cost millions to develop because of the terribly precise machining operations required and the fact that the rotor speeds would have to get up around 100,000 to 200,000 rpm! The adverse effect of viscosity on small components would hurt, too, and the combustion problem would drive a development group crazy.

A model ramjet could be built quite easily. It would be heavy and large for its performance, though, as low speeds are used by models. A ramjet designed for 5 lb. thrust at 50 mph would be about 18 in. in diameter, about 3 ft. long and would gulp fuel at the rate of a gallon and a half per minute. Then you still have to develop a launching system to get it up to that speed.

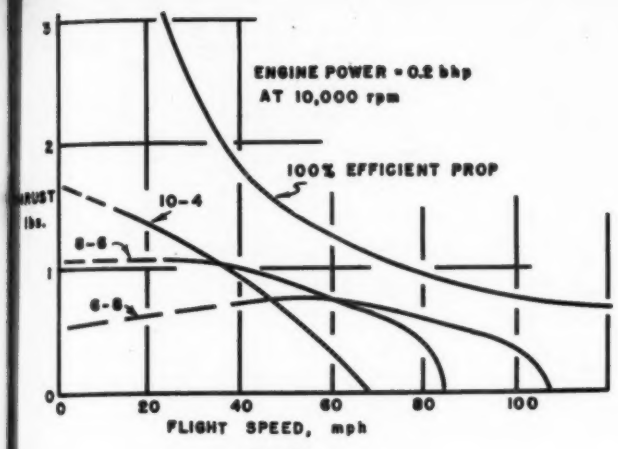


Fig.11

Well, we are now left with the following engine types useful for models: 1. Propeller-piston engines; 2. Ducted fans driven by piston engines; 3. Rockets; 4. Pulsejets.

We won't have to discuss rockets very much here for two reasons: 1. The rocket is unaffected by changes in air speed, altitude, position, direction, or what have you, putting out a constant thrust as long as its fuel lasts; 2. An excellent article on model rockets (Jetex) was published in MAN, June '54.

There really doesn't seem to be too much reliable data on the other types, common as they may be. Therefore, there is nothing for us to do but plow into the problem, slide rule in hand, and see if we can come up with a reasonable analysis. Here goes. Figs. 8 and 9 of last month's article showed the thrust and power outputs of the various engines as a function of their flight speed. Looking back at these figures, we can make some immediate deductions. First, we are interested in low speeds only. I doubt if we would want a 500 mph model if we could have one. Even 200 mph is awfully fast, except for the special high speed events. Actually what we are after is "scale speed"; that is, we would like to see a one-tenth scale model fly at one-tenth the speed of the full scale plane because then we get the illusion of full scale reality. So let's restrict ourselves to the low speed end of these curves.

The second observation we can make is that the propeller is going to have it all over the other types at the very low speeds, unless the other engines are much bigger. (In the previous article we had the engine sizes selected to produce equal thrust at 375 mph). The propeller system is going to be used as our standard of comparison from here on, so we will have to examine it in more detail. The propeller curve we showed last time was really for a modern variable pitch prop. Model builders, and lightplane pilots, too, are struck with fixed-pitch props for financial reasons ($). The performance of a fixed-pitch prop is quite a bit worse, because the design must be a compromise between the various flight conditions. The propeller efficiency (the ratio of the power put into propelling the airplane to that put into the propeller) will decrease on both sides of the design point (specified by airspeed, power, rpm). At low speeds, the propeller efficiency not only falls off, but the higher relative angle of attack of the prop blades absorbs more power at the same rpm. This causes the rpm to drop off, so that the engine produces less power. At static conditions a part of, or all of, the prop blades usually stall. Thus static thrust is not a good measure of the flight performance of a prop, unless it is to be used on a VTO ship.

At high airspeeds, the lower relative pitch angle of the prop allows the engine to over-speed. This usually causes some decrease in available power. The most important factor, though, is that the propeller efficiency will actually go to zero at a high enough speed. (*Continued on page 44*)

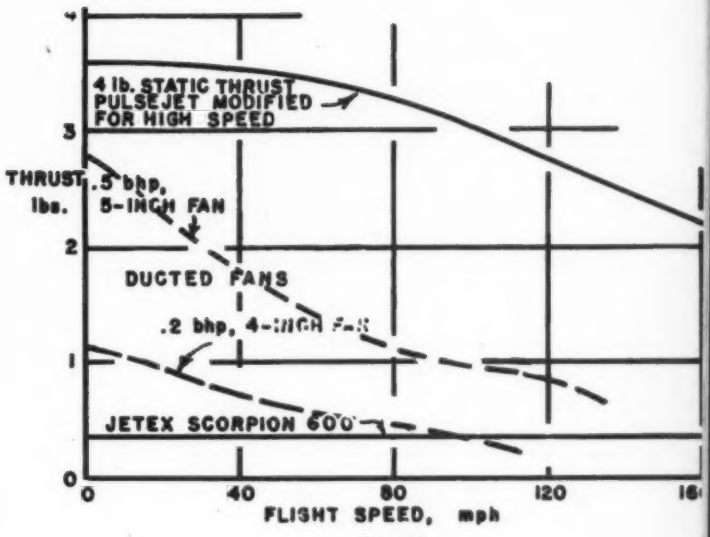
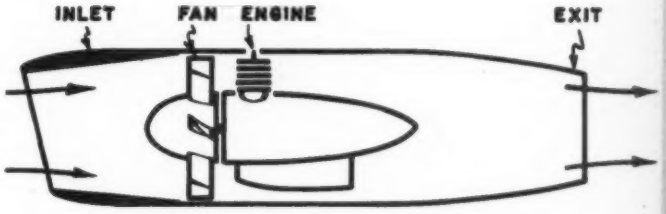


Fig.12



MODEL DUCTED FAN

Fig.13

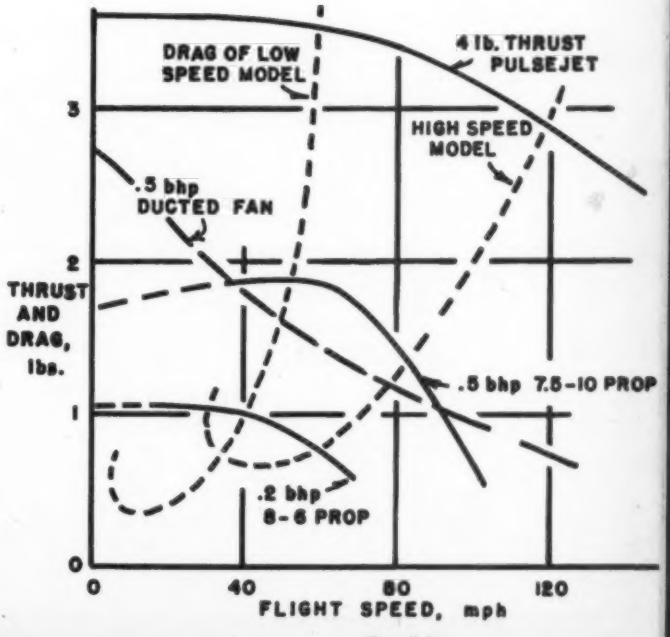
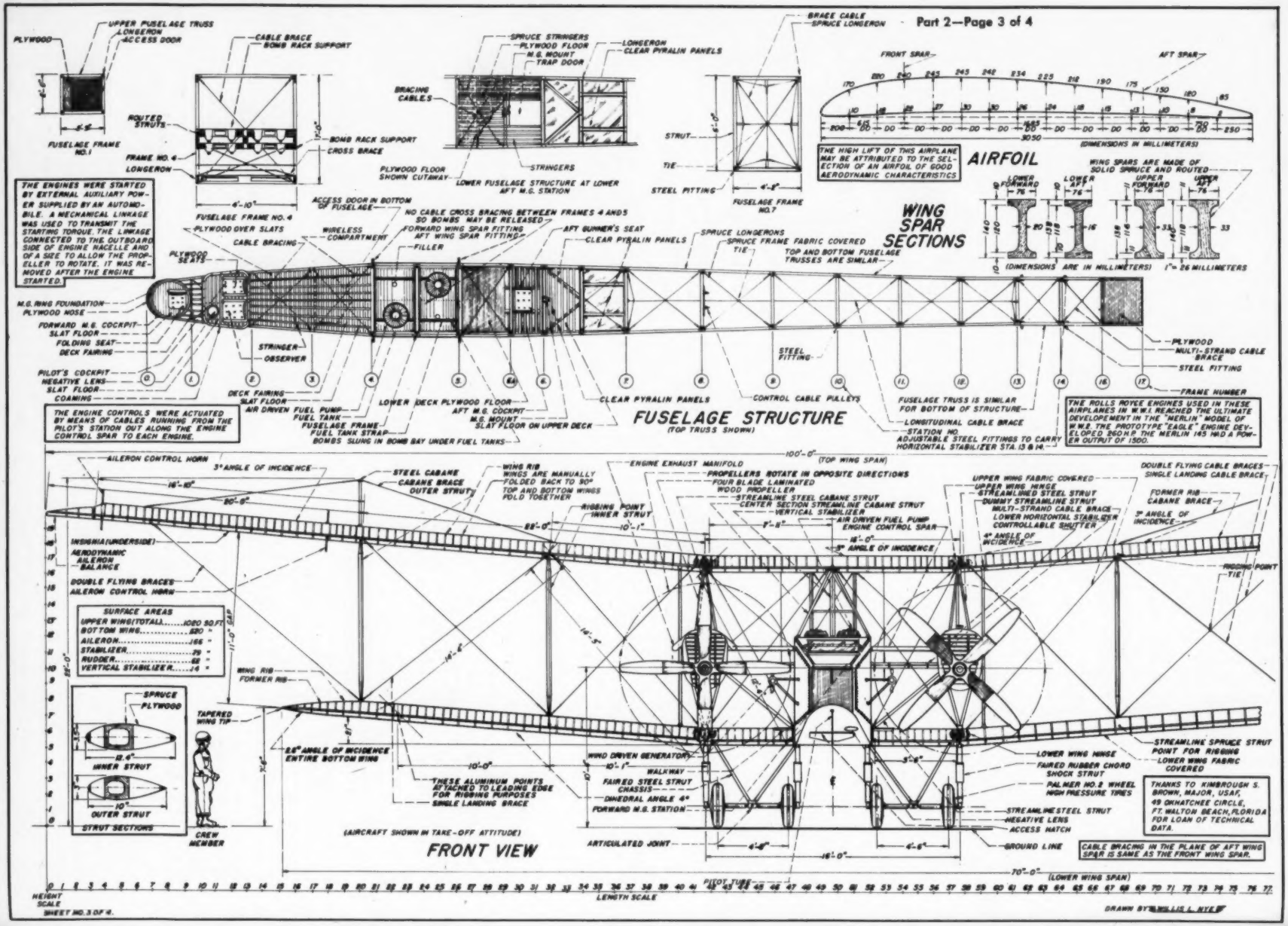


Fig.14


THE ENGINES WERE STARTED BY EXTERNAL AUXILIARY POWER SUPPLIED BY AN AUTOMOBILE. A MECHANICAL LINKAGE WAS USED TO TRANSMIT THE STARTING TORQUE. THE LINKAGE CONNECTED TO THE OUTBOARD SIDE OF ENGINE NACELLE AND OF A SIZE TO ALLOW THE PROPELLER TO ROTATE. IT WAS REMOVED AFTER THE ENGINE STARTED.
THE ENGINE CONTROLS WERE ACTUATED BY MEANS OF CABLES RUNNING FROM THE PILOT'S STATION OUT ALONG THE ENGINE CONTROL SPAR TO EACH ENGINE.
THE HIGH LIFT OF THIS AIRPLANE MAY BE ATTRIBUTED TO THE SELECTION OF AN AIRFOIL OF GOOD AERODYNAMIC CHARACTERISTICS
AIRFOIL
WING SPARS ARE MADE OF SOLID SPRUCE AND ROUTED
WING SPAR SECTIONS
(DIMENSIONS ARE IN MILLIMETERS)
1" = 26 MILLIMETERS
FUSELAGE STRUCTURE
(TOP TRUSS SHOWN)
THE ROLLS ROYCE ENGINES USED IN THESE AIRPLANES IN W.W.I REACHED THE ULTIMATE DEVELOPEMENT IN THE "MERLIN" MODEL OF W.W.II. THE PROTOTYPE "EAGLE" ENGINE DEVELOPED 260 H.P. THE MERLIN 145 HAD A POWER OUTPUT OF 1500.
FRONT VIEW
(AIRCRAFT SHOWN IN TAKE-OFF ATTITUDE)
SURFACE AREAS
UPPER WING (TOTAL)..... 1020 SQ.FT
BOTTOM WING..... 520 "
AILERON..... 166 "
STABILIZER..... 79 "
RUDDER..... 62 "
VERTICAL STABILIZER..... 74 "
STRUT SECTIONS
THANKS TO KIMBROUGH S. BROWN, MAJOR, USAF, 49 OKHATCHEE CIRCLE, FT. WALTON BEACH, FLORIDA FOR LOAN OF TECHNICAL DATA.
CABLE BRACING IN THE PLANE OF AFT WING SPAR IS SAME AS THE FRONT WING SPAR.
SHEET NO. 3 OF 4.
DRAWN BY WILLIS L. NYE

THE WING WAS FABRICATED IN SEVERAL SECTIONS AS SHOWN. CLEVIS TYPE HINGE FITTING ARE USED TO ATTACH AILERONS. FORWARD AND AFT SPAR JOINT FITTINGS CONSIST OF STEEL PLATES ON EACH SIDE OF SPAR WITH THROUGH BOLTS. FOLDING HINGE ON AFT SPAR CENTER SECTION WAS OF MALE AND FEMALE CLEVIS TYPE.

HANDLEY PAGE LTD LONDON ENG.

MODEL 0/400

THE MODEL O/400 WAS ORIGINALLY MODIFIED TO CARRY 6 PASSENGERS FOR CIVILIAN FLIGHT ACROSS ENGLISH CHANNEL, BEING FIRST AIRPLANE TO DO SO. IT WAS ALSO FIRST AIR TRANSPORT TO FLY IN SCHEDULED NIGHT FLIGHTS ACROSS THE CHANNEL. IN 1916, A MODEL O/100 CARRIED 20 PASSENGERS ALOFT SETTING A WORLDS RECORD. HANDLEY PAGE TRANSPORT, LTD., FOUNDED IN JUNE 1919 WAS FIRST BRITISH CIVILIAN AIRLINE TO CARRY PASSENGERS.

AILERON (LEFT SHOWN)

OUTER WING (LEFT SHOWN)

CENTER WING

RUDDER (RIGHT AND LEFT SIMILAR)

VERTICAL STABILIZER

OUTER LEFT LOWER WING (RIGHT WING SIMILAR)

LOWER CENTER WING (RIGHT SIDE SIMILAR)

WING RIB (TYPICAL)

MODEL O/400 NACELLE (RIGHT AND LEFT NACELLES ARE SIMILAR)

THE SUPPORTING STRUTS FOR MODEL O/100 ENGINE NACELLES ARE SIMILAR TO MODEL O/400.

NAVAL INSIGNIA

UPPER HORIZONTAL STABILIZER

LOWER HORIZONTAL STABILIZER

MODEL O/100 NACELLE (RIGHT AND LEFT NACELLES SIMILAR) ROLLS ROYCE 360 H.P. ENGINES)

THE ROLLS ROYCE ENGINES WERE WATER COOLED 12 CYLINDER VEE TYPE DIRECT DRIVE. EACH PROPELLER ROTATED IN OPPOSITE DIRECTIONS TO NULLIFY PROPELLER TORQUE EFFECTS.

THE MODEL O/100 HAD A FUEL TANK LOCATED OVER THE BOMB BAY IN THE FUSELAGE. THE MODEL O/100 GEOMETRICAL CONFIGURATION AND DIMENSIONS ARE THE SAME AS MODEL O/100. THE PERFORMANCE AND RANGE WERE LESS THAN MODEL O/400 AS WELL AS THE GROSS WEIGHT. THE FOLDING WINGS WERE A DESIGN FEATURE OF HANDLEY PAGE BOMBERS.

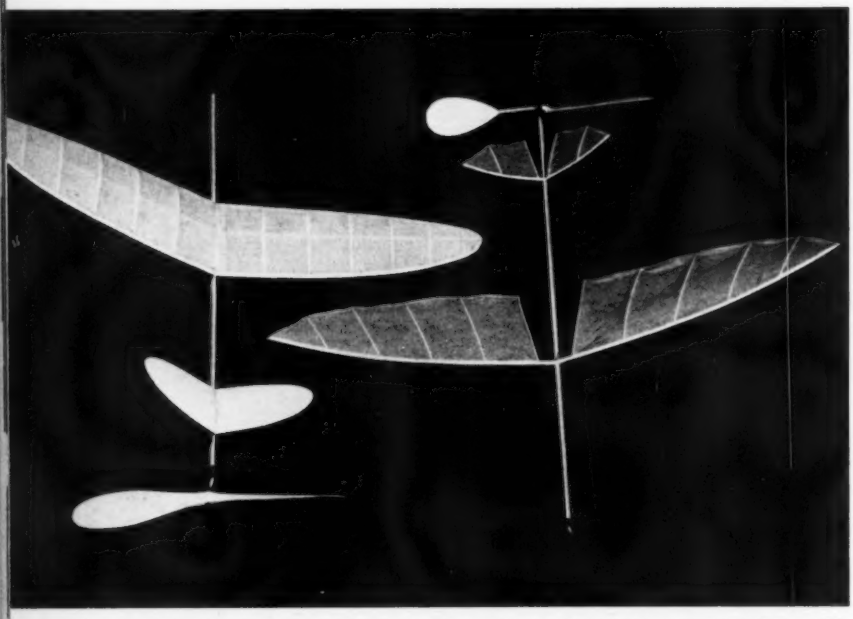
LANDING GEAR

SHEET NO. 4 OF 4.

DRAWN BY WILLIS L. NYE

Alphonse Penaud, 1850-1880.

After You, Alphonse



Left, a modern "Penaud" and, right, authentic Penaud constructed of modern materials. See pg. 26.

by CHRISTY MAGRATH

For centuries men foresaw the airplane. Penaud went them a few better as successful modeler.

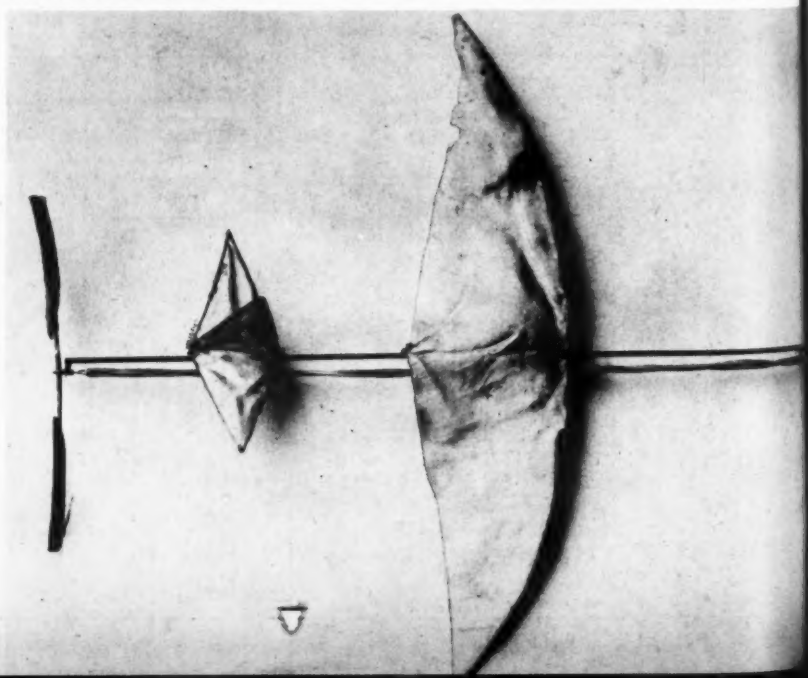
Long before the Wright Brothers made their first trip to Kitty Hawk, there lived and worked in Paris, France, a studious young man named Alphonse Penaud. As the Wright Brothers' work gave us successful powered flight, so did the work of Penaud give us the sport of flying model aircraft, although he never thought of it in this manner. Like other early experimenters, (and some modern ones, too) he was of meager means and had to find inexpensive means of conducting his experiments in aeronautics. Others before him, notably Sir George Cayley in England, and Launoy and Bienvenu (1784) in France, had used flat steel springs and whalebone corset stays for motive power in very early helicopter experiments.

Born in France, Penaud wanted to enter the French military service as a career, but fate decreed otherwise. While still in his teens he was stricken with a hip disease necessitating the use of crutches. Although his health improved, he never gained the strength he desired and he devoted his time to the study of mathematics and its application to the then tough problem of human flight. Far from being just a modeler, his work was very important in the development of the aeronautical sciences. Many aircraft flying today incorporate some of his ideas in one basic form or another.

The flexible wing idea Penaud first tested on his Planophore series of models was used by later experimenters on successful powered aircraft and is used today on our B-47 jet bombers. He invented the retractable landing gear, the ruddervator and other basic design features as well. He experimented with many shapes and forms of wings and "automatic" rudders, as he called the tail groups, and one of his models, bought by Dr. S. P. Langley, is preserved in the National Air Museum (Smithsonian Institution) in Washington, D.C.

Langley was impressed by Penaud's fore and aft system of balance and experimented with the idea himself. Penaud began his experiments in 1870 with a helicopter of the early Cayley type, but for the first time in history used rubber bands as a motor. He first tested the idea of rubber bands under tension and, finding this impractical, became the first to use twisted rubber bands instead. Just what brand or kind of rubber he used is not definite, (*Continued on page 51*)

World's first rubber-powered model—it flew 131 feet in 1871—brought to this country by Langley.



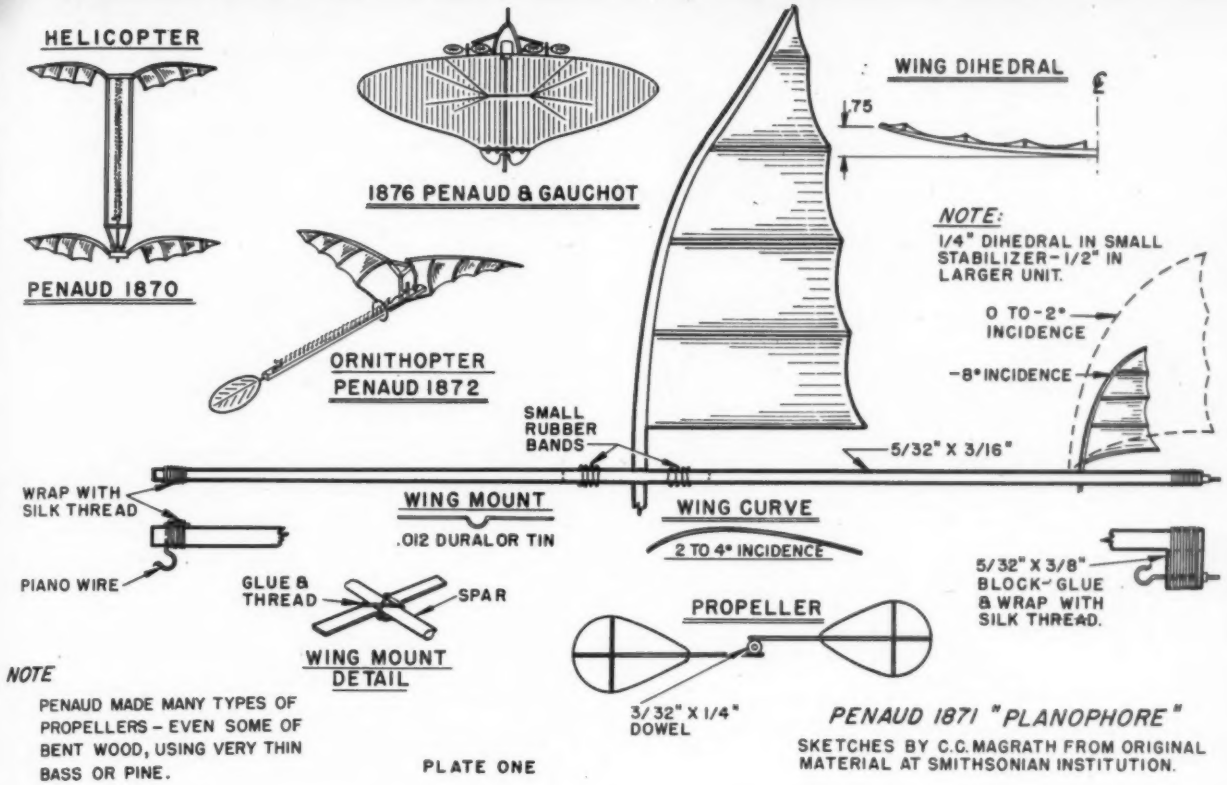


PLATE ONE

These sketches of details worked out by the amazing Penaud and proved practical in his experimental flying models bear fascinating similarity to present day ideas in model aviation.

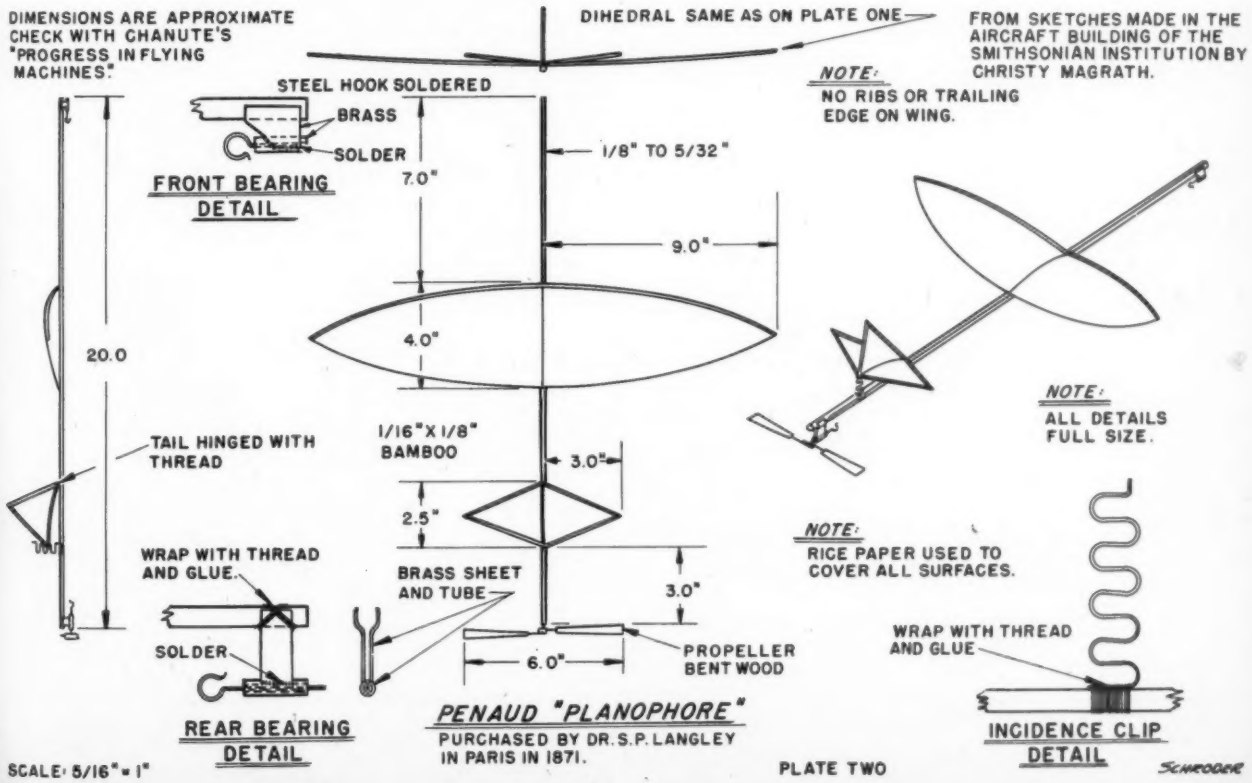
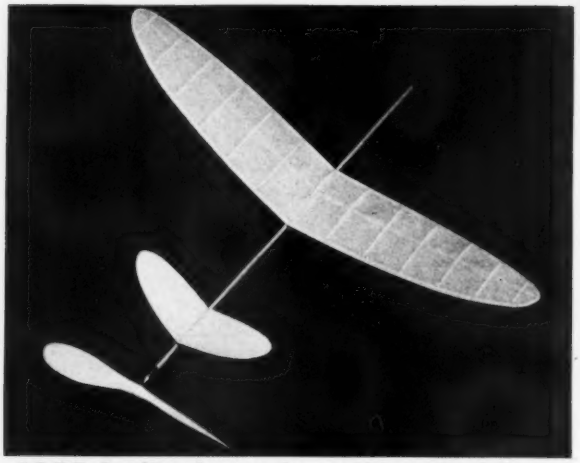


PLATE TWO

1871 With winder, the duration of the modernized Penaud, as constructed here by Del Gatto, approached respectable minute.



1955 By taking advantage of every trick known to today's contest modelers, it was barely possible to double the duration.

PENAUD'S PLANOPHORE

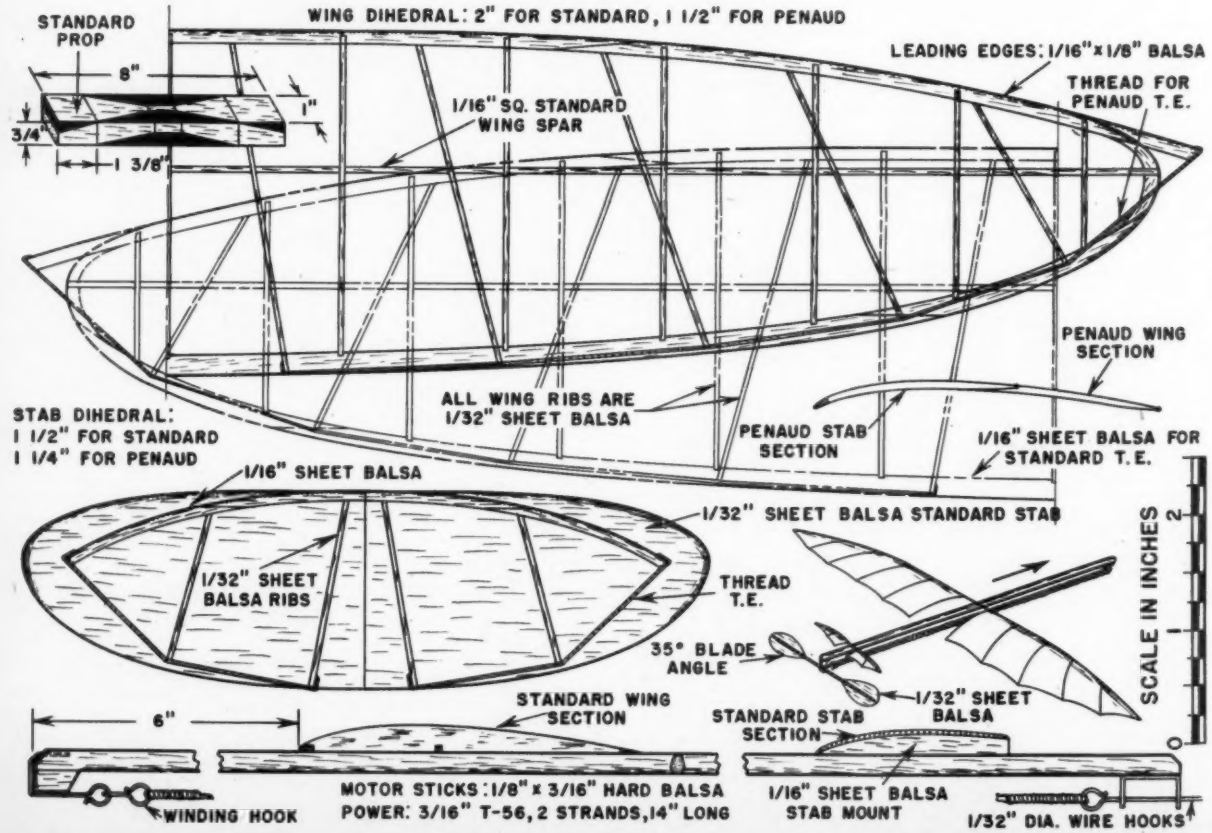
1871 vs. 1955

By PAUL E. DEL GATTO

Suppose Penaud had balsa wood? Or modeling tissue? How, then, would his design compare with present day models? Very well, says this author.

▶ Intrigued by what we had read of Penaud, we undertook a novel experiment by constructing one of Penaud's rubber models to almost identical proportions and then constructing still another model of approximately the same proportions, but modifying it in accordance with present standard model airplane practice. We wanted to see just how performance of a present type model design would compare with that of one originally conceived 84 years ago.

When completed, the models weighed .35 oz. and .45 oz. ready to fly, the lighter one being the Penaud. Of course the use of balsa and superfine tissue, while not used sparingly, still resulted in a lighter weight than Penaud could hope to achieve with the materials then at his (*Continued on page* 45)



will you meet the challenge?

You asked for tougher PAA-Load Events. You fellows have "complained" that the old Rules and Specifications were too easy. You asked for a tougher goal to shoot at—in the coming 1955 Nationals.

Now you've got it! The winners this time will really be the "crème de la crème," of model builders. Purpose is still the same: to encourage the building and flying of model aircraft that resemble full-scale airplanes with respect to *carrying a payload safely through the air*:

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FIRST American airline to operate a permanent international service. (1927)

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FIRST airline to develop and use instrument flying techniques. (1929)

FIRST airline to develop and use long-range weather forecasting. (1935)

FIRST airline to complete round-the-world flight (military). (1942)

FIRST American airline to install GCA for overseas landings. (1946)

FIRST airline to research and use jet stream winds across the Pacific. (1953)

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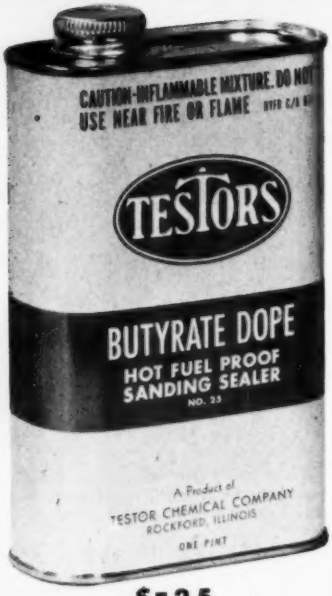

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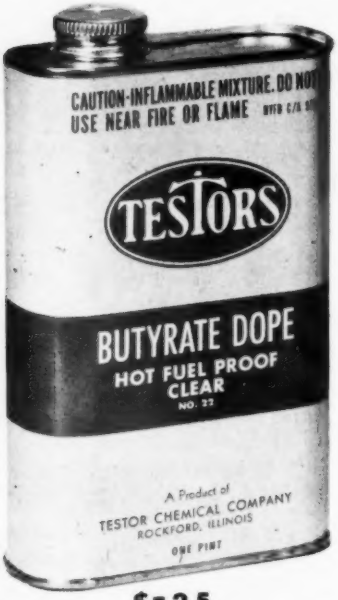

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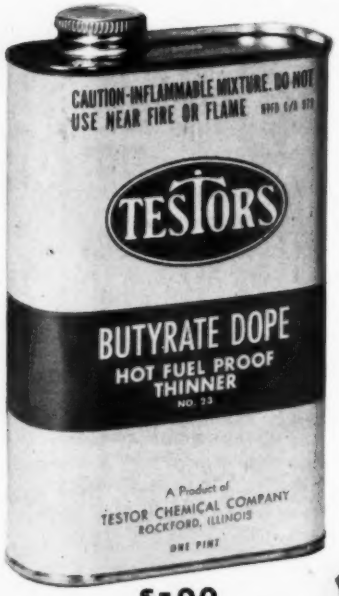
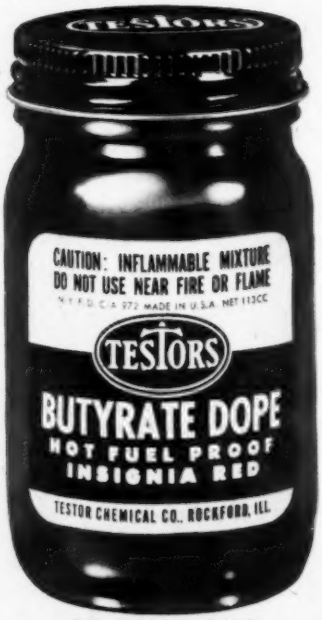


$1.00
PINT CAN



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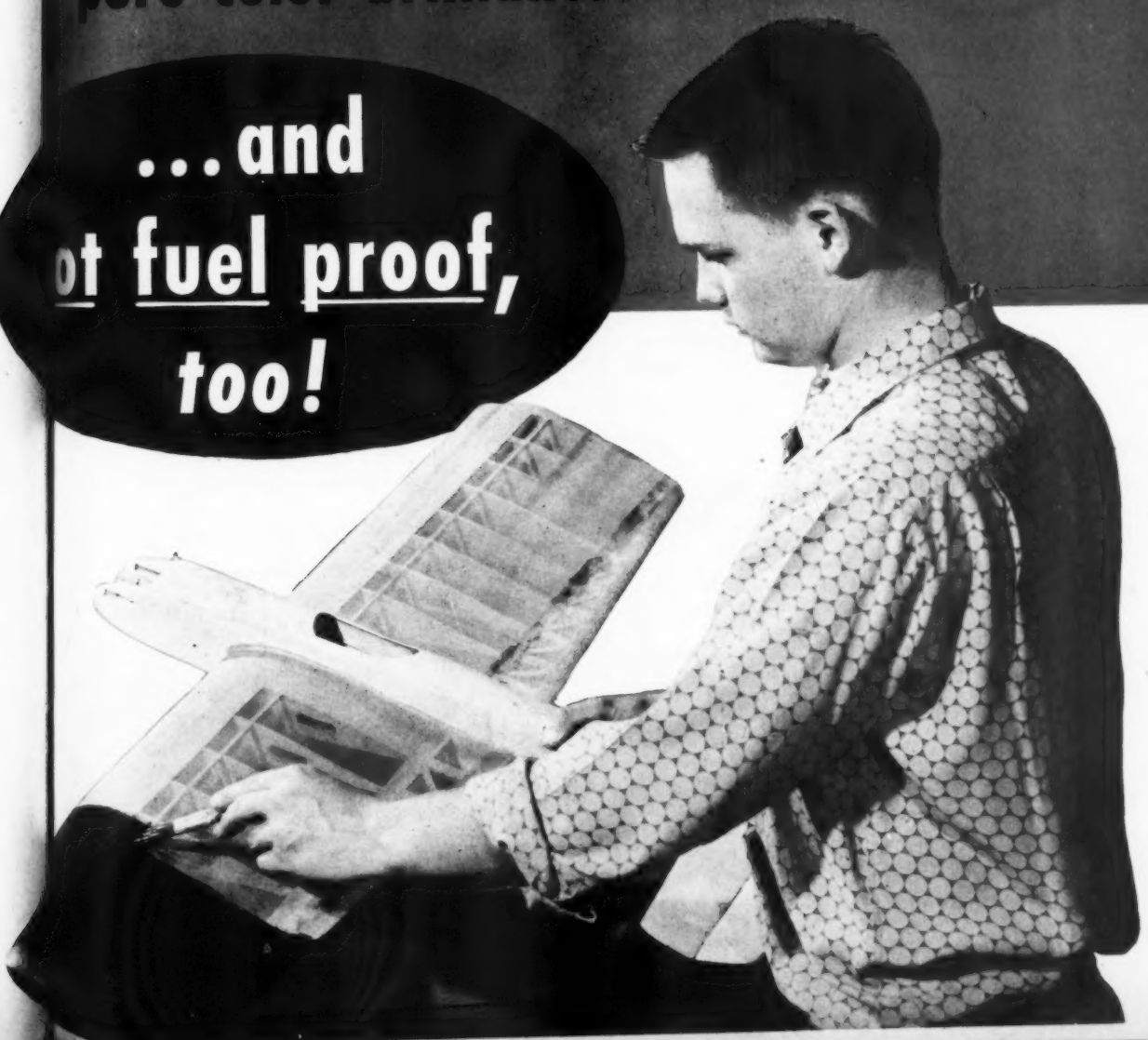


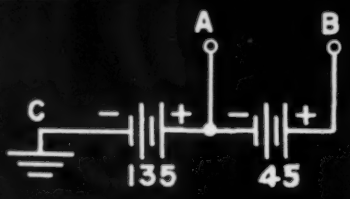
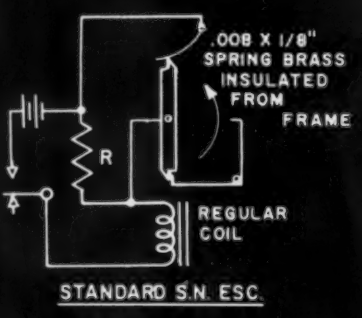


FIG. 1



STANDARD S.N. ESC.

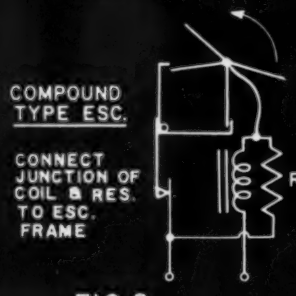
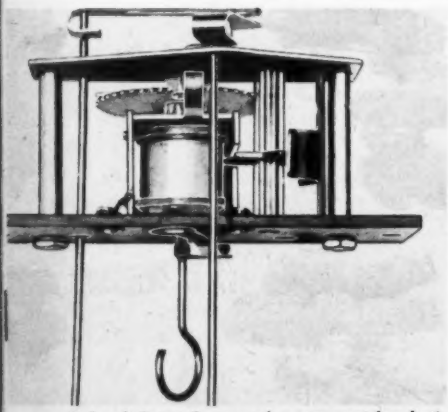


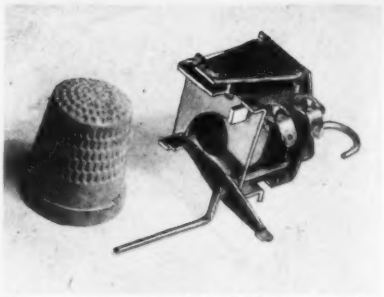
FIG. 2

What happens when you substitute components? This, other topics, authoritatively discussed.



Babcock Super-Compound escapement has both rudder, elevator torque rods; is lightweight.

Bramco six-channel receiver stresses a great increase in effective reed bank contact time.



Newx escapement weighs 1/2 oz., operates 1-1/2 volts, 225 ma draw, to 3/16 in. rubber.

RADIO CONTROL NEWS

by E. J. LORENZ

▶ Many readers have written in wanting to know if the battery hook-up on our transmitter, in the August, 1954 issue, is correct. Yes, it is correct, and Fig. 1 explains it. With reference to the common ground connection at C, point A will measure 135 volts and point B will be at 180 volts, or 135 plus 45. This method of obtaining various voltages is common technique when using a battery power supply. It eliminates the need and some of the disadvantages of a voltage divider resistor across the entire supply.

This idea could also be used to good advantage with a two-tube receiver. The first stage would employ a 45 volt battery for the RK-61 and a 15 or 22-1/2 volt battery could be connected as shown, for the second stage, to enable more relay current to be drawn.

There was also a slight misunderstanding in the transmitter article regarding the proper voltages to use. This was an oversight on our part. The 90 and 45 volt batteries were used for testing, or for lower output in regular operating. For maximum output, 135 and 45 volts should be used. This will place 135 volts on the oscillator and 180 volts on the final. Depending on how hot your oscillator is (this will depend on the particular crystal and tube), you may get along using 90 volts on the oscillator and another 90 volts in series to give a total of 180 volts on the amplifier.

A very common question that arises quite frequently is the matter of what substitutions may be made in the components of a receiver or transmitter. It is urgently requested that all persons sending in schematics list the exact size and tolerance and type of component used. This will help not only the builder but will eliminate any comeback to the designer when someone uses other than a specified component.

First of all, we'll take resistors. Variable resistors are, in 80 per cent of the cases, of 10 per cent tolerance. This means that 50K potentiometer or rheostat could have a maximum reading of from 45K to 55K. In most cases this can be tolerated. Except for the maximum setting, the value is variable. However, when a fixed resistor is used, the tolerance factor becomes more important. Any circuit using resistors has an optimum operating point, governed by the value of the resistor. It is suggested that you employ 10 per cent tolerance resistors in your circuitry, going to 5 per cent or closer only when needed, such as in frequency determining networks or voltage divider networks. In many cases, the use of 20 per cent resistors can produce quite varied results and then you may wonder why the circuit does not function as it is supposed to. Resistors have no voltage polarity and the breakdown rating is generally 250V or higher.

With capacitors, the same holds true. Capacitors used in RF frequency determining circuits, as generally used in RC work, should be at least 10 per cent tolerance. Audio frequency determining circuits will probably use 5 per cent tolerance or better. RF or audio bypass capacitors are generally of 20 per cent tolerance, since their prime purpose is to provide a low reactance path for RF or audio frequencies.

And now a word as to the types of capacitors used in particular applications. The voltage breakdown of the capacitor must be considered and in frequency determining networks the voltage applied across the capacitor is generally low and practically any ceramic or mica capacitor will do the job. Bypass capacitors must, in general, be capable of working across the full applied voltage, which is anywhere from 45 volts on receivers to over several hundred volts on transmitters. (*Continued on page* 38)

SPITFIRE PRODUCTS'...NEW .049

The 1955 Spitfire .049 was designed for the advanced model builder and flyer, who wants a small, lightweight .049 engine to power his new model. To assure complete satisfaction and 100% perfect operation **each SPITFIRE .049 is checked and TEST-RUN at the factory.** Like all other Spitfire Engines, the .049 carries a 90-day guarantee.

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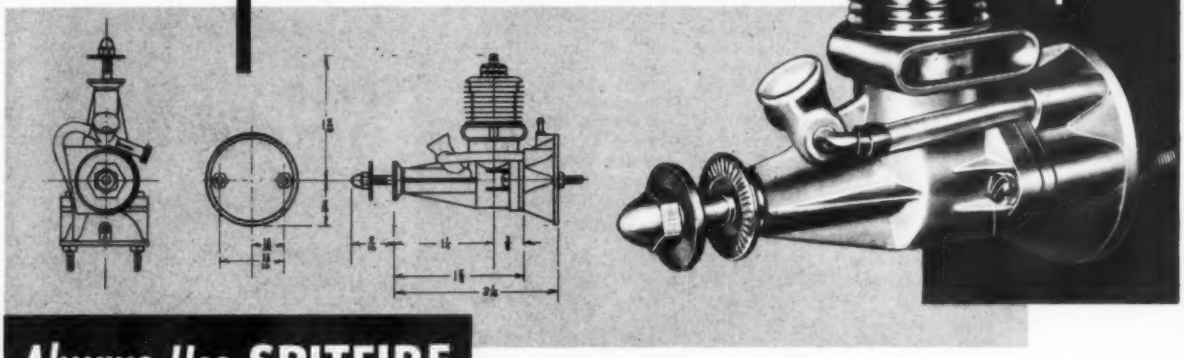

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- Handles both ¼" rubber for large models and ⅛" rubber for ½A jobs—ample power for *any* rudder application.
- Special coaxial magnetic circuit guarantees *many times more efficiency* than that of any other escapement.
- Cuts escapement battery weight in *half, doubles* battery life. Uses one pen cell.
- Elevator and rudder control linkage furnished with unit—*no extra cost.*
- Simplest to install. Torque rod bearings in frame insure automatic alignment.
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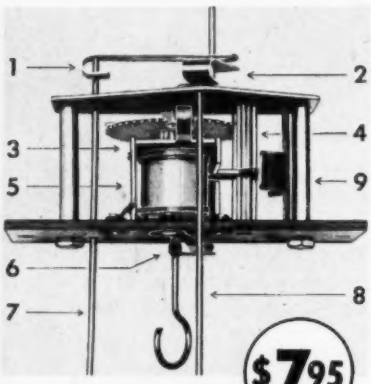

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P. G. F. CHINN

FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

by P. G. F. CHINN

New Development in Molded Balsa

The latest Jetex developments in molded fuselage shells for scale models are permitting less complicated internal structures to be used, yet result in stronger and better finished models.

Early scale kits had body halves molded from 1/32 in. sheet balsa reinforced with tissue paper on the inside. This was an effective answer to the problem of providing smooth skinning of curved fuselages without the weight and complication of planking. However, to insure adequate strength and rigidity, a fair amount of interior structure was required. The shrinking effects of cement and dope on the outer skin also occasionally gave an appearance of "sagging" between formers unless the latter were placed closely together.

On the latest Jetex kits a new type of molded half-shell is being used. This consists of two laminations of 1/32 in. sheet balsa, without paper backing but with a special glue-film between the two plies. This film is a thermo-setting resin and tends to hold the half-shell firmly to the correct contours as well as preventing the wood from splitting. Most important, however, the extra thickness gives a really strong and rigid fuselage which, even with a simplified base structure, lends itself to more accurate and better finishing.

New Italian Barbini Motors

A new name among European motors is the Barbini, made by the *Officina Meccanica A. Barbini of Milan.* We were offered one of the first production models, a .06 cu. in. (1 cc) shaft valve Diesel, for test some months ago. We found it to be a pleasant handling little motor with a performance which very much belied its slightly old fashioned appearance. Compared with most European 1 cc Diesels, the B.38 is quite small and weighs less than 2 oz.

For 1955, Barbini has come up with a new motor, to be known as the B.40, in the popular .15 cu. in. (2.5 cc) displacement class. We shall be reporting on this model in a later issue.

Bay Crossing in Australia

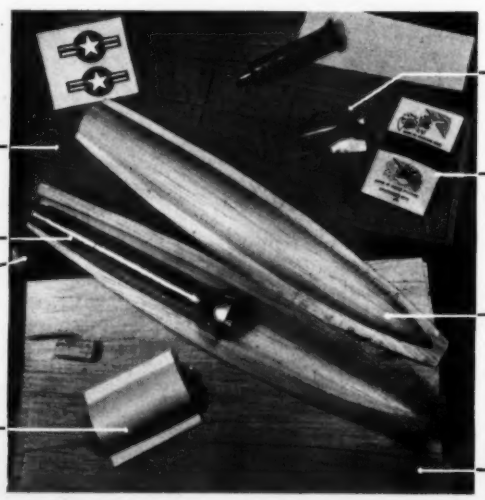
In a contest sponsored by the Melbourne *Sun-News Pictorial,* eight RC enthusiasts recently endeavored to fly models across the four miles of open water between Williamstown and Elwood. According to Jim Fullarton, writing in Australian *Aircraft* magazine, the event was one of the most exciting and dramatic he had ever witnessed.

Winning model was Keith Hearn's 5 ft. *Robot,* powered by a .15 cu. in. ED Diesel, which crossed in 9 min. 10 sec. Control was shared by a team of three, each with separate transmitters, the first being at Williamstown to control the take-off, the second on a fast Royal Australian Air Force crash boat to guide the model across and the third at Elwood to land it. Second place winner was Norman O'Farrell's *Radio Queen* (similar to the English Channel crossing plane) which made the trip in 9 min. 20 sec. Both models, incidentally, were controlled during their crossing by Reg Cooper whose own model was eliminated in a take-off crash.

New Swiss Racing Motor

Reputed to be the nearest to equaling the Dooling .61 yet achieved in Europe is a new Swiss .60 cu. in. racing motor to be known as the *Amro.* The engine is, in fact, closely modeled on the Dooling, has the latter's roller crankpin bearing and the same type of hemispherically shaped bypass with the entire charge transfer from the crankcase taking place through skirt ports. As on the Dooling, the carburetor is inclined and eight head screws are used.

The engine, unlike some copies of noted designs, is undoubtedly well engineered and the output is reported to be in excess of 1-1/2 hp. A reed-valve version of the motor has also been built. This motor has a special backplate



The English Jetex kits are featuring an improved type of molded balsa fuselage shell construction.

A clockwise Japanese speed job did 128 mph on OS Max .29. Front valve. Note tip streamlining.

with a center intake and a standard carburetor. There are six ports leading outward in a cone formation from this center intake, which are covered by a six-petal valve.

Davies-Charlton Plans for 1955

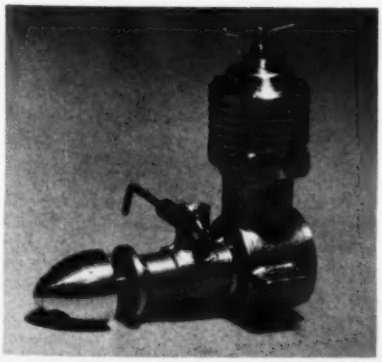
Davies-Charlton, manufacturers of the popular Allbon range of motors, will bring out three new engines during 1955. Emphasis will continue to be on compression-ignition types, with marine glow plug versions to follow. Latest Allbon engine to be put out in watercooled marine form is the .06 cu. in. Spitfire. The low-priced Merlin will also be available watercooled. Very shortly a new plain bearing 3.5 cc (.21 cu. in.) Diesel will appear from this maker to replace the original DC 350 model introduced five years ago. Two more Class A motors will follow during the summer.

Russian Portable Runway

A new solution to the problem, where runways are not available, of providing a suitable take-off strip for ROG events, was seen at the Moscow International meet. This consisted of a large portable wooden runway which would fold up to form a trailer. The trailer platform, forming the base section of the runway, was 14 ft. 3 in. long and 8 ft. 3 in. wide. Length was extended to 22 ft. 9 in. by a rectangular folding rear section and, to allow for possible swinging on take-off, two triangular "wings," hinged from the sides of the base, extended the maximum width to nearly 25 ft. One advantage of mounting this sort of thing on wheels is, of course, that it can be easily manhandled to a new position in the event of a change in wind direction.

Super-Tigre Developments

Latest news from *Micromeccanica Saturno*, Italian Super-Tigre engine factory, is that the *G.21* twin ball-bearing glow plug .29 is, like the world's record holding *Tipo G.20*, now being produced in a lapped piston version, while the *G.23* .15 cu. in. Diesel has undergone modification (*Continued on page 47*)



Another newcomer, the Italian B.38 Barbini .06 cu. in. Diesel; light and has good performance.

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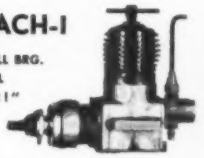
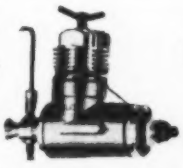


We have a letter from P. G. F. Chinn, noted British engine authority, which states that Eddy-current Dynamometer testing is very inaccurate. So what is the output of a Mach 1 as tested on the more conventional torque reaction Dynamometer? According to Mr. Chinn, it's 29 H.P., very close to our original figure. Measure it any way you choose, with a stop-watch, a straight up climb, or just the breath-taking scream you hear, the Mach 1's got it; plus easy starting at almost wide open compression settings. Also, this stocky little brute has an irresistible charm for those who enjoy quality.



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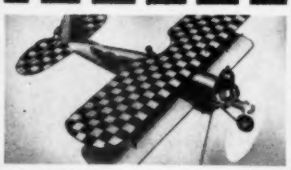

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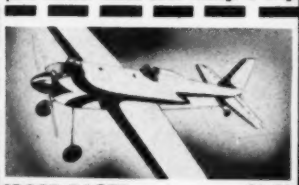

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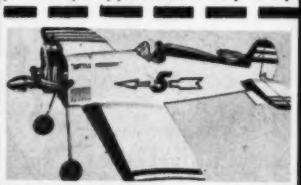

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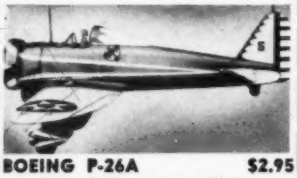

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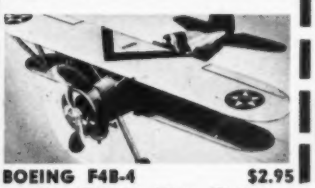

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Bi-Gone . . .

(*Continued from page* 14)

woods if you aim at contest performance. Fuselage sides are cut from medium soft balsa. Pin the sides together while cutting and sanding to outline so they will match and the bulkheads will line up properly in the notches. Bulkheads Nos. 2 and 3 should be cemented in place first. Wet outside of fuselage sides from bulkhead No. 4 to the stabilizer leading edge notch. Cement bulkheads Nos. 4 and 5 in place using a length of rubber wrapped around the fuselage at bulkhead No. 5 position. The rubber should be left in place several hours until the cement has set permanently. The motor mount nuts should be cemented to the back of the firewall so that thrust adjustments can be easily made on the flying field. The fuselage nose doublers and nose top filler sheet can now be cemented in place. A dethermalizer hatch door in the fuselage bottom is recommended. It may be operated by a lightweight Elmic timer or dethermalizer fuse which will allow the hatch door to drop open and release a 'chute attached to the tail with a light cord. A fuse-operated 'chute will add very little weight.

If you plan to carve the wing trailing edges yourself, it will be easier to carve and sand them before building the wings. The leading edges may be carved after the wing panels are built since the geodetic ribs allow carving and sanding without damaging the structure. Let the wing panels dry well before removing from the plans. This will give warp-free surfaces.

The landing gear is cemented in the lower wing center section. The position shown on the plans was proven best after experimenting with several gears mounted on bulkhead No. 2 which resulted in ground looping. The landing gear as shown gives successful take-offs.

The wing covering should be colored Japanese tissue or rubber model Silkspan. Three or four coats of clear Aerogloss will give a lightweight finish. A lightweight finish for the fuselage and tail can be obtained with one coat of Aerogloss clear mixed with talcum powder and sanded with fine sandpaper followed by three coats of Aerogloss Transparent Color dope. If desired the fuselage may be finished by covering with fine colored tissue followed by three coats of clear fuelproof dope. The original Bi-Gone had a heavy finish since it was intended to be a sport model. It was covered with gas model Silkspan and given numerous coats of dope which resulted in a 7-1/2 oz. ship. No doubt your model will give higher flight times than the original if you use the lightweight covering and finish recommended.

Give your Bi-Gone right rudder and *slight* left engine thrust before attempting any test flights. After hand gliding, begin power flights with the prop mounted backward and a very rich needle valve setting. Under low power your ship should cruise in slow left turns. Observe the glide carefully making certain it glides in right-hand turns. Trim the glide angle as flat as possible, adding weight to the nose or tail if necessary. Do not change the glide adjustments once the glide is perfected; the correct power pattern is obtained by engine thrust adjustments. Use more power on each flight, making sure your ship climbs in left-hand spirals (opposite of the glide turn). Any tendency to loop under power can be corrected by more left thrust or downthrust if necessary. The above left-right flight pattern is definitely recommended for successful flights. With this set-up your ship will consistently fly the same way each time. The right rudder adjustment keeps the nose up while climbing in left spirals.

A hot .049 or .051 hauls this little biplane upstairs in a hurry so remember to set the dethermalizer or your Bi-Gone may be gone forever. END

The Mustang

(*Continued from page* 10)

1/2 in. hardwood motor mounts to suit the engine being used and glue to the plywood with Weldwood. Cut the fuselage sides from 3/16 in. medium hard balsa and cement liberally to stiffeners. Bolt the engine in place and cement the rear of the fuselage sides together. When it dries thoroughly, glue the fuselage formers in place, starting with plywood firewall C. Cut the stabilizer and elevator from 3/8 in. medium sheet and sand to airfoil shape. Built-up construction was used for the tail surfaces of the original, but the weight saved was offset by an ounce of ballast in the tail that was required for proper balance. A Veco control horn and wire pin hinges as shown on the plans, or any method you may prefer, may be used to hinge the elevators. Apply several coats of sanding sealer to the stab, sanding each coat well. Offset bend one end of the 1/16 in. dia. pushrod wire and insert in the middle hole of the Veco horn. Punch clearance holes in the formers. Cement the stabilizer firmly to fuselage. Top planking may be added.

Note that the bottom view of the wing is shown in the drawings of the model. However, construction is identical in both panels and they should be constructed right side up. Limited space allows only the root and tip ribs to be shown (W-1 and W-7). Cut these from plywood and insert five pieces of 3/32 in. sheet balsa between them, drilling as shown on the plans. Bolt this assembly together. Using a sharp knife or sanding block, cut the ribs to shape. Mark the spar locations, but do not cut at this time. Duplicate this operation for the other half of the ribs. Cut the spars from 3/16 in. medium hard balsa and the joiner from 1/8 in. plywood. Cement liberally together. This automatically forms the right dihedral angle.

Next, butt-join 3/32 in. balsa sheets and cut to the shape of the wing covering. In doing this, be sure to cut the sheets so that the grain of the front sheet will be parallel to the leading edge and the grain of the rear sheet parallel to the trailing edge. Bevel the trailing edge to the contour of the airfoil. Cement the spars to the lower covering, and add the ribs when dry. Bend a 3 in. Veco bellcrank as shown and mount on 1/8 in. plywood cemented firmly to the spar and center ribs. Use several washers between bellcrank and plywood.

Note the generous amount of 1/8 in. music wire and plywood used on the landing gear installation. The landing gear on a model of this type has to take a lot of punishment. On the original model, a wheel came off during a contest flight and the resulting hard landing, on concrete, bent the strut back a full 60°. The only damage to the model was a small crack in the lower covering near the leading edge. No further damage occurred when the music wire strut was bent back to its proper position.

Check with the scale drawings for the proper shape of the landing gear. After bending the 1/8 in. dia. music wire struts to shape, one right hand and one left hand, attach them securely to the 1/8 in. plywood mounts with soft copper wire or J bolts. Scale appearance can be achieved by wrapping the wire with paper strips. This assembly can now be cemented to the wing and the leadouts installed. Twist the ends of Pylon flexible leadout wires and solder *very carefully*. When a leadout breaks and a scale model splatters, it isn't a very pretty sight.

Cement 1 oz. lead weight in the right wing tip. Add the top covering and the 1/8 x 1/4 in. leading edge. Scraps from the sheets from which the fuselage sides were cut may be laminated for the wing tips. Sand the wing and check carefully for warps. Apply several coats of sanding sealer, sanding be-

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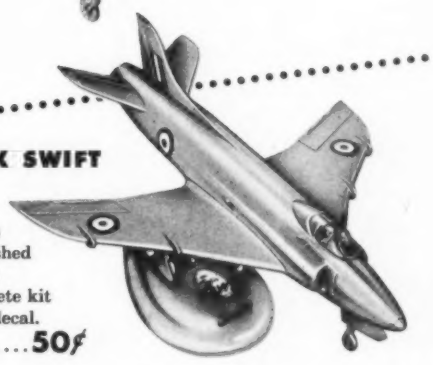

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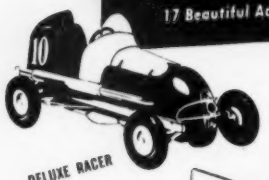

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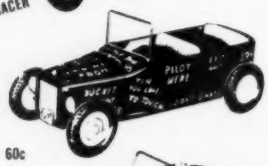

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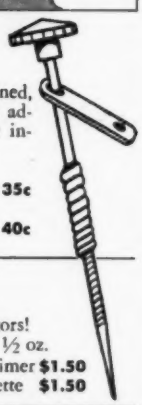

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tween each coat.

Using gussets and plenty of cement, the wing may now be attached to the fuselage. Check alinement carefully. Link pushrod to bellcrank during this operation. Because of the relatively small elevators, at least 30° up-travel is required. Check for free-movement. With the top planking in place, the rudder may now be cut from 3/8 in. sheet balsa, sanded to airfoil shape, given several coats of sanding sealer, and cemented in place. Offset about 25° to the right. Roughly carve the rear lower fuselage block, hollow, and cement in place. Attach the 1/16 in. music wire tailwheel yoke to a scrap of plywood and cement in place. Plank lower fuselage from D to G and add radiator scoop block, noting scoop fillet outline. The radiator scoop should be hollowed for realism.

For complete engine accessibility on the flying field, the entire nose section forward of firewall C is removable, coming off in two parts. The cowl separation lines of the big Mustang are followed. The use of a hardwood spacer behind the propeller and a McCoy .29 prop nut enables the engine to be moved 1/2 in. rearward so that the exhaust will go out through the opening which is the filtered air duct on the real plane. A drilled aluminum plate can be held in place with 00-90 model railroad screws and removed for flying. Using this arrangement, no additional hole for the exhaust need mar the appearance of the model.

The lower section of the cowl is one piece, while the upper section consists of two side pieces of 3/16 x 2 x 5 in. sheet balsa, two 1/2 x 1-1/8 x 1-1/4 in. blocks immediately in front of the motor mounts, and one 1-1/4 x 2-1/2 x 6-1/4 in. block on top. Tack cement the roughly shaped blocks and plywood former A in place. Carve and sand to shape with the aid of template B, then remove and hollow. The five pieces of the top section are then reassembled permanently. Perfect alinement can be assured if the engine and spinner are installed before carving the cowl blocks. The spinner will then serve as a template.

Dress snaps can be used to hold the upper section, while bolts are more desirable for the lower cowl. Fuelproof the entire engine compartment thoroughly and install a fuel system large enough to permit test running on the ground as well as some time in the air. A Maeco utility C tank with the fuel lines relocated fits the space nicely.

Sand the fuselage and apply several coats of sanding sealer. Plastic Balsa is used for all fillets. Cover the entire model with Silkspan, using a double layer over the cowl to provide a hard base for a lasting finish. Cut twelve pieces of 1/4 in. brass tubing into 1/2 in. lengths and cement them in the location of the exhaust stacks. Fair in with Plastic Balsa. The inside pieces, 5/32 in. tubing painted dull black, are to be installed after color doping. Give the entire model four or five coats of clear fuelproof dope and sand well. After the control outlines are scored, the model is ready for color doping.

Nine coats of silver Aerogloss were used in the original, the last two being sprayed. A good finish requires plenty of sanding, so don't spare the elbow grease. Also, many thin coats are better than a few thick ones. The soft nature of most silver dopes will not allow the use of rubbing compound; when you apply the last coat, you've done all you can do. Mask off the anti-glare panel, wing tips and rudder tip. Apply a coat of clear followed by three or four coats of colored. Check scale drawings for color scheme. All dials, knobs, handles and switch panels in the cockpit are dull black. The rest of the cockpit interior and the wheel wells are zinc chromate green. Zinc chromate is a metal primer and the simulated color is obtained by mixing a little olive drab with yellow and metallic green. Check with your local airport.

Decals should be applied next. The surface must be perfectly clean for best results. The lettering is cut from black Ezee-Cut decal material. To aid in this operation, all lettering has been drawn on the working drawings of the model. Trace the outline onto the back of the decal material (remember to draw it backward) and cut out with a sharp razor blade. A neat job at this stage of the game will greatly enhance the appearance of the finished model. Additional scale details such as rockets, radio antennas, wheel doors, etc. may be added after waxing. Scale wheel hubs may be fashioned from aluminum or brass. Trim a Berkeley P-51 canopy to fit, or mold your own from plexiglass, as you prefer. The original model had a sliding canopy operating on music wire rails.

Balance the model at the point shown on the plans. Do not hesitate to use ballast in the tail if necessary. It was found that the laminarflow airfoil made it necessary to move the center of gravity aft of the point that would be used on a conventional wing. Make first test flights from a smooth dirt or grass site during calm weather. The model lands fast, so keep the nose up.

Plans for several other versions of the Mustang appeared in the January, 1955 issue of MODEL AIRPLANE NEWS. Additional information and details are available and we'll be glad to help if any builders care to drop us a line in care of this magazine

Bill of Materials

Five 3/32 x 3 x 36 medium soft for wing skin, fuselage planking, ribs, formers;

Two 3/16 x 3 x 36 medium hard for fuselage sides, wing tips, cowl sides, spars;

One 3/8 x 3 x 36 medium soft for tail surfaces;

One 1/8 x 1/4 x 30 hard for leading edge;

Two 3/8 x 1/2 x 6 basswood for motor mounts;

One 3/8 x 36 hardwood dowel for rockets;

One 1/8 x 6 x 12 plywood;

Soft blocks as required.

One pair 1-3/4 Perfect wheels; one Veco 7/8 tailwheel; one Froom 2 spinner; 1/8 x 24 music wire; 1/16 x 24 music wire; lead-out wire; 1/4, 5/32, 1/8 and 3/32 brass tubing; McCoy .29 prop nut or Veco extension shaft; Veco 3 bellcrank; Veco control horn; Silkspan; canopy; black Ezee-Cut; four National Insignias.

Dope as follows: sanding sealer, clear, silver, olive drab, green, yellow, red, black, zinc chromate green. END

Radio Control News

(*Continued from page* 30)

However, there are applications in certain relay, vibrator and other circuits where the actual applied voltage is but a fraction of the voltage applied across the capacitor. A plate bypass capacitor as used in a one-tube receiver, with the relay in the late circuit, may have several hundred volts applied to it when the field currents in the relay coil collapse, as the set is turned off. Even though only 45 volts is applied to the circuit, the plate bypass capacitor should be able to withstand three to five times this voltage.

For values of capacity from 1 mmf to about 1,000 mmf, tubular ceramics will do the job, with silver-micas being recommended where good stability is needed. Temperature compensated tubular ceramics are also acceptable for critical work. Disc capacitors are generally used when a value of from .001 to .03 mfd is required. From .02 mfd up, a good grade of paper capacitor is generally used. Except for electrolytic capacitors (usually from .25 mfd up) there is no need to worry about voltage polarization. However, where noted in a schematic, be sure to observe the correct polarity for this type of capacitor.

(*Continued on page* 40)

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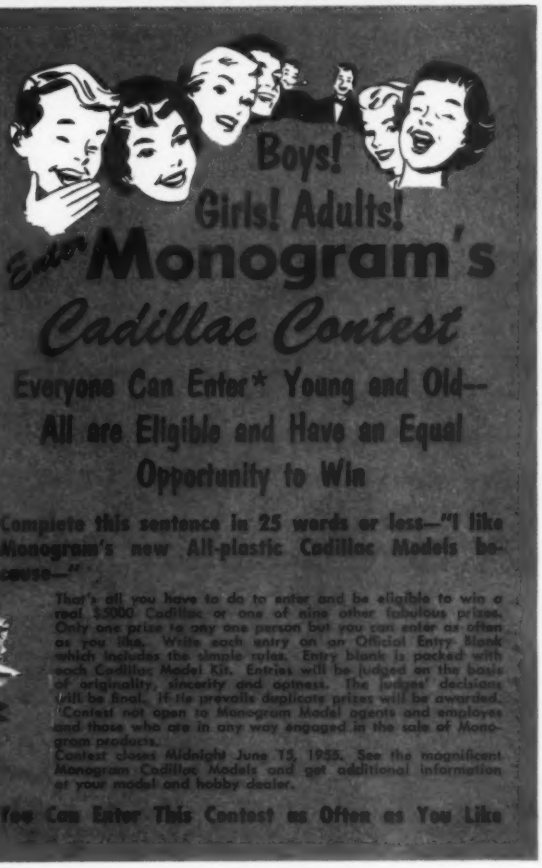
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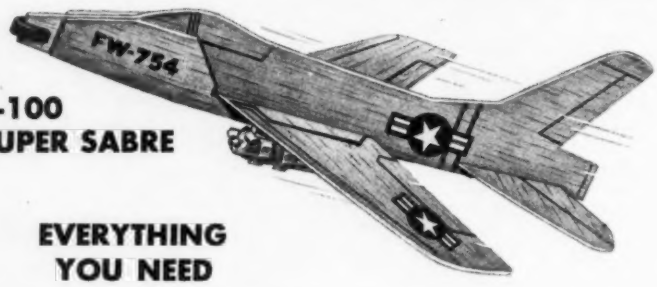

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Variable capacitors come in an assortment of shapes and sizes and types. Perhaps the most commonly used types in RC work are the air trimmers and ceramic variables. For low losses, air trimmers are generally used. The average APC type of air trimmer, with a gap between the plates of about 1/32 in., will have a capacitance of about 6.5 mmf between plates. An air trimmer is generally used in transmitter circuits where RF losses are to be kept to a minimum. Since the dielectric constant of ceramics is greater than air, ceramic capacitors are capable of being made smaller for a given value. Many readers wonder about substituting variable capacitors of a value other than that specified. This will work perfectly with the following provisions. If a 4-25 mmf variable is specified and a 7-45 mmf is used, the tuning spread will not be quite as broad, thus possibly making tuning a little difficult. If a 1.5-8 mmf variable is used, it may have to be "padded" to the proper value with a fixed capacitor. This will give more spread for finer tuning, but is a tricky thing to do unless a grid-dip meter is used. To generalize, substitutions may be made in most cases, but it is far better, unless you know what you are doing, to follow schematics exactly. Next month we'll discuss other components in this same manner.

Fig. 2 is the work of Brent Reusch, 45 Laurier Ave., Yorkton, Sask., Canada and shows how a current saver arrangement may be used on practically any SN escapement now in use. A resistor is used in place of a double wound coil and the value of the resistor should be determined experimentally—probably something in the range of 15 to 27 ohms. Be sure the wiper arm is insulated from the escapement frame.

For those of you who prefer to stick to our original two-tube receiver, about the only improvement we can offer is on the matter of sensitivity and selectivity. This will apply to *any* super-regenerative receiver. To increase sensitivity and selectivity, the quench frequency must be lowered. In other words, optimum conditions exist when there is the greatest difference in frequency between the quench frequency and the incoming frequency. This can be accomplished by increasing the values of the grid-leak resistor and/or capacitor. On our set we suggest raising the grid resistor to between 3.9 to 4.7 megohms and increasing the value of the capacitor from 100 mmf to from 120 to 150 mmf. It has been found by exhaustive tests that by lowering the quench frequency in RK-61 circuits, the receiver will be less susceptible to improper operation when a large number of tubes is tried. At the present time, it is quite possible for the RC builder to obtain three different "types" of RK-61 tubes. By lowering the quench frequency, we have been able to use RK-61's which were over five years old and obtain practically the same results as with the new long-life types.

Incidentally, the receiver by George DeLaMater in the September, 1954 issue has given rise to a few questions. Mr. DeLaMater wishes to point out that for proper operation, the quench coil be a National OSR 100 kc oscillator coil, obtainable from Allied Radio Corp., 100 N. Western Ave., Chicago, for $2.07, plus postage. Also, the 1 megohm resistor in the grid circuit of the 114 should be a variable, not fixed, as this will allow the correct operating point to be made.

Club News

A very interesting letter came in from William E. Kenyon of Manlius, N. Y. recently. Seems as though our prediction that RC may some day become as popular as U-control has already hit the Sky Knights of Syracuse, N. Y. Out of about 35 ukies, there are now but four or five left in that field; the rest are either flying or learning to fly RC. Practically every type of RC plane that has been put into a kit or plans of which have been published in

various magazines has been built by this club. And get this: all RC planes up there use Diesels, with a few ignition jobs thrown in for old times' sake. About 40 of our two-tubers take care of the radio gear. This is quite an active RC group and anyone interested in radio flying in central and western New York State should contact Bill.

Some correspondence has come in from overseas and from behind the Iron Curtain. As soon as we get some more of it deciphered, we'll pass on the information. However, in this field, it looks as if people can get along very well. Russian fliers are using the ED Diesels and photos of a production line show quite a few sets being made. The transmitters were fairly small but the receivers were a little large, compared with what we might be used to. The rather large tank coil was the only indication of the frequency they use, and we judged that to be between 25 to 50 mc. German-made equipment stacks up very well and typical German engineering is evident. One nice feature, and one that some of the West Coast boys are playing with, is that the batteries are in a complete case by themselves, the receiver being connected by cabling. Another item was a subminiaturized four-tube audio receiver not much larger than a penny box of matches. More on these when it comes out of the code room.

New Items

Now that multi-control flying is in a class by itself, we present a five and six-channel receiver by BRAMCO, Branstner Manufacturing Co., 1717 S. Main St., Pleasant Ridge, Mich. The photograph shows the six-channel unit in its case. This company states their reed relays have a reed contact time of from 13 to 15 per cent as compared with the average of two to three per cent. This means a more positive action of the secondary relays. The reeds show no noticeable difference in frequency response between 10 to 100° F. Any trouble in this respect is usually caused by the audio drift in the transmitter, which in turn can generally be traced to poor power regulation. Cure is to use good batteries of adequate capacity. Prices are $96.50 for the five-channel unit and $116 for the six-channel set. Reed assemblies alone are $21.50 for five reeds and $31 for six reeds. These receivers will also be made available in kit form.

Perhaps some of the best news for the RC flier in quite some time is the announcement that Electronic Specialty Supply Co., 58 Walker St., New York 13, N. Y. will handle replacement Sigma 4F relay coils. Selling for only $2.10, these 8,000 ohm coils will come complete with core and mounting bracket. This is the first major step of a well known relay manufacturer to help the RC modeler. Now it is no longer necessary to junk an otherwise good relay just because the coil goes bad.

Several issues ago we mentioned a new escapement by NEWX Products Co., P.O. Box 643, Union, N. Y. A pre-production sample was received about the middle of January and a few tests were run on it. A month later, a regular production model was received, which incorporated the latest changes and improvements. This little "tip of your thumb"-sized 1/2 oz. escapement is rather amazing in several ways. First, it will operate on only 1-1/2 volts and, secondly, the amount of overlap between the escapement arm and the pawl borders on the fantastic. A photograph shows this escapement, which draws about 225 ma, and which will operate up to 300 cycles per minute. Using from one loop of 1/8 in. rubber to one loop of 3/16 in. rubber, this unit should open new fields for auxiliary equipment. Model 506 operates on 1-1/2 volts and Model 512 operates on 3 volts, but with a very low current drain. A clever lever action between the armature and the pawl makes this escapement rather unique. Now with a rudder-only event in RC flying, it looks as if this

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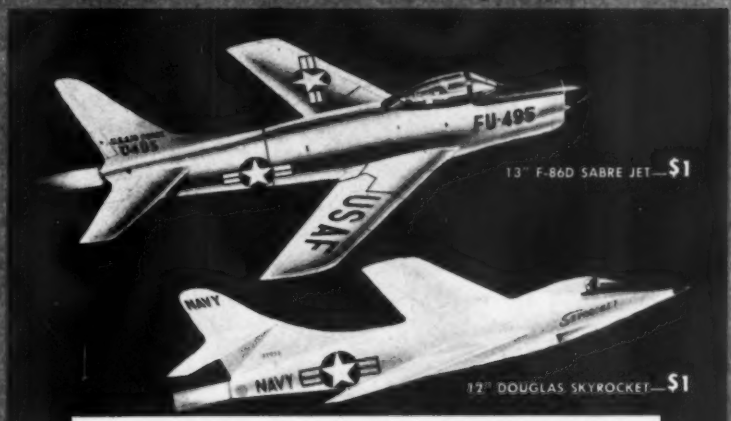

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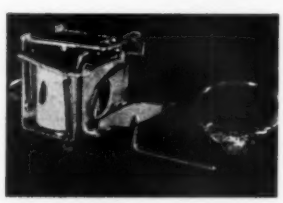

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is one escapement that should make good. The price is about $6.95.

While on the subject of escapements, a last minute item came in from Babcock Radio Engineering Co., P.O. Box 3097, Van Nuys, Calif., on their new $7.95 escapement. Known as the Babcock Super-Compound Escapement, this unit features rudder, elevator and a secondary escapement switch control. The unit is not much larger than the regular compound escapement and, coming from the Babcock labs, and Dick Schumacher, there is no doubt about its operating properly. The photo was a rush job in time for this writing but models were not yet available. More on this next month.

There is one item we tried to get photographs on but, believe it or not, the item was so small and compact we couldn't get a picture to do it justice. It is the new Telex subminiature phone jack and plug. Here is one item, scaled down from the average size for such units, that is a beauty to behold. Extremely well made, very small and with practically insignificant weight, this jack is small enough to mount directly alongside a subminiature tube on the receiver or transmitter chassis. Telex of Saint Paul 1, Minn. make these units which may be available through regular radio supply houses. The price is 50¢ for the jack and 35¢ for the plug. A well worth while sub-miniature item just to look at, even if you never use it.

Need a new auxiliary meter for your shop or perhaps a versatile meter for your toolbox? Then look into the new 1-1/2 x 3-3/8 x 4-1/4, four color, 12 oz. multi-tester, known as the Pacom, distributed by Gyro Electronics Co. of 325 Canal St., New York 13, N. Y. Complete with test leads and battery, this compact meter will measure current from 15 to 750 ma, DV volts from 15 to 3,000, AC volts from 15 to 3,000 and up to 100K on the resistance scale. The Pacom is built with precision resistors and the model we checked was within two per cent on all scales and ranges. Selling for $9.95, this meter should eliminate "de-bugging" jobs on the field. Gyro also has the new seven-pin miniature plug and shield with a socket for only 50¢. This is the unit we used on our new receiver.

END

Gliders Five . . .

(*Continued from page* 18)

cement the paper to a small block of wood so that the edges of the sandpaper do not dig into the wood.

To prevent the freshly cemented parts from sticking to the work table, place underneath them a paper that has been rubbed with dry soap.

Note that part of the rear of models one, three and five is cut out and cemented back in place, but with an angle. This gives stability to the model.

All the gliders are tail heavy and some weight is required in the noses to move the center of gravity to the proper place in relation to the flying surfaces. Modeling clay is good for this purpose, as it is easily put on and off. However, bits of metal, like small nails, may be cemented on until the required weight is reached.

The gliders are flown by throwing them gently forward and downward. Remember a glider is not a powered plane and its flight path is downward and not upward in normal flight. Before adding weight to the models, it will be noticed that the models nose up and down violently, but as weight is added, the flights become less rough and eventually iron out into a smooth even glide. After the models are balanced, gliders two and four can be thrown with more force and banked up in a turn for longer flights. You can now experiment with them as you wish and warp the surfaces with your breath and fingers to see what will happen.

END

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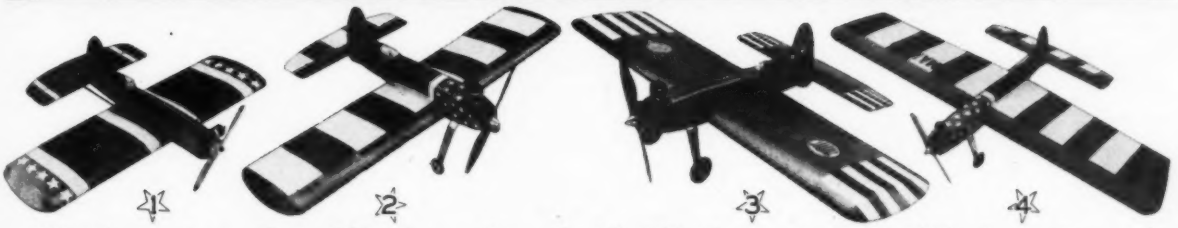

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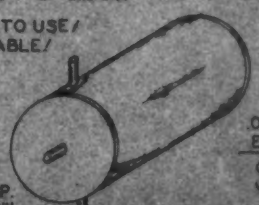

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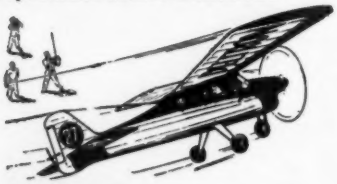

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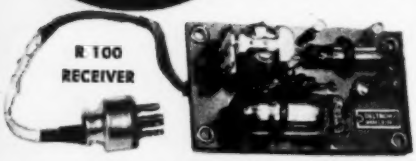

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All About Jets

(*Continued from page 21*)

This speed can't be reached in level flight, of course, because of the power required. In a dive, the power comes from the loss of altitude (potential energy) and it is possible for a plane to dive so fast that the prop actually acts like a dive brake, at the expense of the screaming engine. (For a good discussion of propeller design see *Aerodynamics for Model Aircraft* by Avrum Zier, Dodd, Mead & Co., 1942.)

Let's take some examples to illustrate these words. But first let me warn you: the prop data presented here are my estimates; any given prop may perform quite differently. There seems to be no published data on model prop performance, so I have taken full scale, fixed-pitch prop data and used educated (I hope) guesses for the scale effects. Model propellers cannot be expected to be as good as full scale propellers through viscosity effects, and the difficulty of accurate small scale profiling. For our examples we will use an engine producing 0.2 bhp at 10,000 rpm. This is somewhere between a 0.1 and a 0.15 cu. in. engine, depending on its make, condition, needle valve setting, etc.

Full scale props are specified by diameter, blade angle at 3/4 radius, and activity factor. The latter describes the blade planform. Model props are described only by diameter and pitch (the forward travel of a blade element in one revolution for zero relative angle of attack). Nothing is said about the planform, so that props of the same diameter and pitch may have completely different prop-load curves; that is, they may absorb different powers at the same rpm and flight speed.

Bearing these confusing points in mind, look at Fig. 11. Here we have the estimated performance of three props: 10D-4P, 8D-6P, and 6D-8P. Also shown is the thrust of a 100 per cent efficient propeller. The first thing you will notice in Fig. 11 is the very poor performance at speeds of 20 mph and less. This is the result of two factors. The small prop diameter causes a lot of energy to be lost in the jet created by the prop. Note the diameter of a helicopter rotor compared with a prop of the same power. The helicopter rotor is designed for maximum thrust at zero speed (hovering). The other factor is the low blade angle required by model props to accommodate high engine rpm. This factor interferes with good performance at all speeds less than 100 mph.

So much for propellers; now let's get back to jet engines. Fig. 12 presents thrust data as a function of airspeed for several different types: rocket, pulsejet and ducted fan. The pulsejet data are not estimates, but were actually obtained from wind tunnel test of a model engine. The engine had been fitted with heavy valve springs to minimize the ram effect and permit high speed operation. This resulted in a slight loss of static thrust, since you can't have everything. The ducted fan data are estimates and represent what can be achieved by careful design and construction. The author has quite a bit of static thrust information on ducted fans and intends to present and discuss it in the next article. For now, just consider this one curve, based on a design shown schematically in Fig. 13.

No comment is required on the rocket performance. Pulsejet thrust drops off at high speed because of the reverse flow up the tailpipe during the intake part of the cycle (see last month's article) and the ram pressure tending to hold the valves open a little, allowing sufficient leakage to lower the peak pressure obtained in the explosion.

The thrust drop-off of the ducted fan engine is similar to that of a propeller, but is not so steep. The principal reason for this is that the ducted fan performance is quite poor at low speeds, so that it doesn't have as far to drop. The thrust of a full scale turbojet drops off in the same manner, and doesn't start to rise again until the airspeed gets up around Mach 1. Thus, in one sense, "ram effect" actually produces a loss in performance. Actually it increases the engine efficiency, but this is a small factor at low speeds, and is not important to modelers. Ducted fan performance can be made competitive to model propeller performance, since model props are relatively inefficient. Continued development of ducted fans can raise their efficiency to around 60 per cent, which is better than most propellers in typical installations.

This performance characteristic of ducted fans will produce model performance quite similar to the full scale thing. Thus, take-offs will be fairly long (unless you use JATO) and low speed flight will be marginal. The "wave-off" from an attempted carrier landing will be a very hairy thing, just as it is in real life with a jet plane. Model carrier take-offs will have to use model catapults.

We can get some feeling for the model performance problem, without going into great detail, by studying the curves of Fig. 14. These are typical thrust-required and thrust-available curves. The thrust margin between a pair is that thrust which is available for climbing. The maximum and minimum speeds that the plane will fly at are determined by the points at which the curves cross, which is the speed at which thrust required is equal to thrust available. The speed for best climb is the speed at which the greatest excess power is available. To see this clearly, it is necessary to replot the curves in terms of power (thrust times velocity). The rate of climb is then obtained by dividing the excess power by the weight of the airplane. For example, assume a power excess of 0.1 thrust hp with a 1 lb. model. The rate of climb will be: RC = 33,000 x 0.1/1 or 3,300 ft. per minute. The 33,000 converts horsepower to foot/pounds per minute in order to get all our units consistent. (Don't blame me, I didn't invent the English system of units.)

Now I think we can sum up the discussion. Taking the propulsion systems one by one:

1. *Propeller-engine combination:* This is a good, tried and proven system for all-around model flying. You have to use good judgment in prop selection, but otherwise everything is simple and straightforward. Its only drawback is that it can't be used to simulate a jet plane;

2. *Rocket:* An excellent device for short duration uses. The presently available rockets are rather low in thrust compared with the other model engines, but are simple and

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apparently foolproof. (They always work for me, and this should be the acid test.) Model rockets are of the solid fuel type, so you have to reload every time, but this is a small disadvantage compared with trying to operate a liquid fuel rocket using typical fuels, such as concentrated hydrogen peroxide, nitric acid, liquid oxygen or aniline. All liquid rocket fuels seem to be dangerous in some manner and they are all expensive;

3. *Pulsejet:* If you can stand the noise, a pulsejet is a very good model jet engine. The static thrust is good enough for short take-offs, and the thrust doesn't fall off too fast for good high speed performance. There are some new, smaller units on the market now, which may prove satisfactory. The old reliable Dynajet has certainly established a performance record hard to compete with, but it is a fairly large engine;

4. *Ducted fan:* This system promises to be the one to use on jet models for free flight and U-control, but it is not yet well developed or available in your local model shop. It is not simple in the sense that all you have to do is buy one and stick it on your plane. In the way that it works, it is as simple as a propeller, but there are more parts to the system that can cause trouble. There is the inlet, the fan itself, the ducting and motor mount, and the tailpipe and exit. All of these components have to be designed carefully; a mistake with any one of them will cause a big thrust loss. Fortunately, we have lots of data available to aid in the design. As development jobs go, this is a fairly simple one. All it takes is a lot of work.

Next month we'll present the results of well over a year's work on the development of ducted fan engines. The author has some fairly good engines developed, using sizes from .049 to .35 cu. in. displacement to drive fans from 3 in. to 5 in. in diameter. Some data on model afterburners will be presented also. If you are a pyromaniac like me, you'll enjoy afterburners, whether they do any good or not. END

Penaud's Planophore

(*Continued from page 26*)

disposal. Had the material we now use and a winding rig been available to Penaud, it is conceivable that he could have achieved flights of approximately one minute in duration, even with the paddle type propeller then used. We have done better than 45 seconds with ours and feel that a minute's duration is within its capacity.

As we had anticipated, performance with the standard type was better and more easily trimmed for flight. We have exceeded 80 seconds on a number of occasions and, had we a larger indoor site to fly in, performance would be greater by perhaps 20 seconds or more.

To us it ceased to seem remarkable that Penaud's model design should compare as favorably as it did, as the basic features of both are similar. Not bad for an 85 year old design.

The construction of the standard type model is simple and straightforward and requires little skill. However, in constructing Penaud's design, care must be exercised in constructing the wing and stabilizing surfaces, as they utilize a thread trailing edge to which the tissue covering is afterward fastened. It may be necessary to use additional thread bracing across the center ribs to keep the wing and stab panels properly alined. When applying covering on Penaud's version, allow an approximately 1/8 in. flap to tuck under and secure the thread within.

It may be necessary to add some ballast to the nose to obtain correct longitudinal trim on both models. Turn and climb adjustments are best made by warping the wing and stab surfaces as required. END

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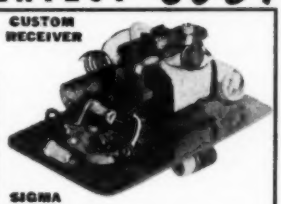

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MAN at Work

(*Continued from page 2*)

His Zipper (Comet) was two years away. But let's stop running engines and launch this crate.

• • •

▸ New engines held the Trade Show limelight. Allyn's Twins, particularly, are significant. Most manufacturers knew the Twins had to come, but until Allyn found the answer to making the crankshaft without the finished product costing an arm and a leg, modelers just hoped. The merger of Allyn and K & B is big news. O & R has a promising .049, with four feather valves, rear venturi, long shaft and other advanced features. Also a water-jacketed boat version with rear flywheel, hardware, and a true pitch prop. Surprisingly, stroke is greater than the bore, so starting and torque should be good. McCoy's .049 has a never-before-seen feature, a fuel regulator valve in the venturi. Herkimer announced a .29 and .35 Cub. That all these boys are bubbling over with future plans was indicated from chats with Charlie Brebeck, Senior and Junior; Johnny "K & B" Brodbeck; Allyn's Al Gasdia; O & R's Harry Rice and Mrs. Sutton; McCoy's Charlie Miller and Keith Storey. Storey, incidentally, one of the FAST Club pioneers of team racing, says FAST is about ready with its RC racing rules. Nineteen's top displacement, apparently. We'd like .15; deBolt .09. New Veco .19, first of hot-engine series.

• • •

▸ In boats, Sterling's giant 48 in. Chris Craft and Veco's tug caught the eye. That Chris Craft is so big that 75 lb. of equipment can be carried—just in case you have a 50 lb. receiver. Two Pittman Panther electric motors drive it at a great rate. One Pittman, 'tis said, has the torque of an .09 glow engine. Veco's big tug has one Pittman, with reduction gear set. Both boats had Babcock three-channel.

Airplane kits include some real show stoppers. Guillow, for instance, had two corking new stunt jobs by Lew Andrews. For big engines, one had that supersonic swept look throughout; the other, the first true combat kit for our money, was a wing, with flipper on the trailing edge. It's a rakish looking job, like a NoBody and Half Fast rolled into one, but prettied up. You don't need a fuselage for combat! The plans feature an exceptionally nice series of construction pictures—an education in itself. Earl Smith and Don Ferguson, who won Senior so many times at the Nats and Internats, on hand to point up the features.

Top Flite has a 24 in. low wing, Space Bug powered—a practical ukie—free flight combo. Previous combos really are free flights, with linkage, etc., hung on. This one has been thoroughly tested as a free flight, but it still looks like a ukie. Five degrees down and right thrust give it a left hand circle, almost as if on wires. Finally, that Dakota by Veco has competition. Did it meet its match? Sterling's Mambo, 48 in. RC, is a cutie. Their Ted Gonzolph, an old indoor record holder (he says Walt Erbach, Lincoln, Neb., has the indoor ingredients these days) led us safely through the Chris Craft kit and showed off the well flown Mambo. Ted's boss, Ed Manulkin, busy answering questions about that Chris Craft. Sells as many, if not more, RC boats than planes. Ain't that somethin'. Dick Dinkel showed Scalemaster giant Ford, B-26, and Stinson. Dick's an old timer, too, and ex-MAN contributor.

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▸ Not too much in radio. DMECO has full line of servos—multi-control units particularly impressive. Crisp, smooth. Switches for all to try; at show's end, big batteries had run down but no failures! Citizen-Ship (Macnabb) had excellent kit for 27 hard tube receiver. Printed circuit, one side chassis. Relay, tube included. Their 465 transmitter in steel case, instead aluminum, and five bucks less. And very smooth selective left-right escapement. If you can remember having been sent for a can of striped paint, or a pail of steam, you'll enjoy Vernon Macnabb's straight-faced talk of an RC decoy (duck, Elmer). Just as straight-faced, Warren Hall, a dealer, said it was multi-channel. Asked what for, he replied, "It quacks!"

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▸ In any show there's always the flight-of-fancy things that result from the manufacturer's giving the green light to one of the designer's more imaginative ideas. Like Jim Walker's sheet balsa glider with automatic pistol type launcher. Jim makes the thing talk—and kids, no doubt, would love it. The Firecat and Firebee you know about. That Firebee can be a barrel of fun—let's hope that dealers are smart enough to emphasize the things that can be done because of the marvelous proportionate engine throttle operable via an airline and bulb held in the hand. Here's a job that does many new things—shooting landings, for example. If they compare this ingenious craft with ready-to-fly stuff, we'll tear our hair out . . . And Berkeley's Bill Effinger, with CO-2 glider and catapult launcher. This tricky catapult shoots the plane off, zowie, as the model nears the end of the track, and pierces the capsule so that the thrust is not wasted, but is added to the momentum of the plane as it shoots aloft . . . Or Tony "old cars" Koveleskie with the most talked-about gadget of all. This was a coil spring. What's so hot about this? Well, when it is attached to the front end of a motor, around the bearing housing, it can be engaged easily with the prop. You wind the prop backward a turn or two and release. The engine starts right now. Never misses. Of course, Tony was starting a Space Bug, but even so his magic spring will solve many a dealer's headaches with kid customers who can't start an engine. He would have started the engine two or three times as quickly as you read this. There was even a space ship. Telasco's Gee Braman was showing off one of the most unusual kits ever engineered anywhere. If we had space ships and launching devices, this would pass for scale. Better than those TV deals! The space ship is seriously thought out, built up. So is the launcher with tricky platform, rails, plastic parts, springs, etc. The ship is launched by spring; Jetex gives it the additional boost to rise high in the air. At flight's end, a parachute pops out to lower the wingless craft safely for the next flight.

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▸ Testor Chemical had one of those mile-long exhibits, stressing dopes and allied products—some of them big stuff in the household as well as the hobby field. Genial Nils Testor, long an industry mainstay, always a big booster for MIA; so are Jack Besser of Mono-

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gram and his associate, Bob Reder. Jack's 'way, 'way up there, now. Bob's an old gas modeler, one of the finest designers in game. Other prime movers interested in MAN readers: Mike Schlesinger and Sid Axelrod, Top Flite (and Sid's an old gas fan); Bill Atwood, Wen Mac's designer, and Bill goes back via the various Atwoods to the famed Cyclones. He's one of country's all-time great indoor builders . . . L. M. Cox convincingly demonstrating his ready-to-fly controlline models by bouncing them off the concrete floor. Davenport, the Pactra Chemical man . . . Johnny Frisoli who had enough brightly and varied colored finished samples of Scientific kits on display to make his booth a show place . . . Wonderful session with Gil Henry, the wheel man (and kits, of course). Wheels make the world go around, regardless of old sayings. Comet's owner, Lou Cohen, with Morrie Shamberg and Grace Vetter (sales). Morrie and Grace go back to pre-war days with Comet.

• • •

The plastic plane and kit manufacturers are still riding the wave. Revell's great display (among others) of over 50 numbers was testimony to the popularity of such products. People in the path of the plastic's steamroller moan, but forget that a dealer can't run a shop on plastics alone, as nice as they are, or that this is good old American competition. Kit design was reduced to routine years ago. Now the boys will have to think. It isn't the modelers who hold up progress.

• • •

Vic Stanzel had some of the nicest samples we've ever seen. Vic's Mono-Line fliers were spic and span. Novel gimmick was use of canopy type wing tips. Yep, celluloid! . . . Dick Newman, showing his ukie jobs. Liked upright engine in his basic trainer . . . Springfield Models has clever line of big profiles coming up. They profile real machines, like old Boeing bipe fighters . . . Jerry Brofman (Enterprise) and the Mrs., who was his helper when he flew his Nationals-winning free flights, had, besides planes, the Space Bug-powered Surf-Skimmer . . . Names that take us back: Paul Lindberg, who designed models for the old Popular Aviation in the 'twenties, early 'thirties, with a spectacular line of plastic replicas. And Sam Goldenberg, Airlane, who was a wheel with pre-war Comet. END

Foreign Notes

(*Continued from page 33*)

and now appears in a lighter and more compact version. At least two new engines are scheduled for this season, both glow plug and Diesel types. In line with most of the bigger producers, *Micromeccanica Saturno* are expected to enter the Half-A market during 1955.

A-M 25 Diesel

A new 2.5 cc engine has lately appeared on the British market. Known as the Allen-Mercury .25, it is a Diesel and is intended for stunt and general free flight use rather than for any specialized competition work. The engine was designed by Dennis Allen, a well known British modeler who, at one time in charge of an engine repair department handling all makes of model engines, has learned much about the shortcomings of numerous different types. Allen also has a hand in the production of some of the earlier Allbon engines and, later, in the production of Amco engines after the original manufacturers, Anchor Motors, had sold these famous Ted Martin designs to the present producers.

With this background of experience, Allen has produced, aided by carefully chosen modern plant, a modeler's engine of sound design and construction at a moderate price. The design is, in general, of an orthodox shaft-valve, radial port layout. The bypass occupies a full 360°, the cylinder being flanged above

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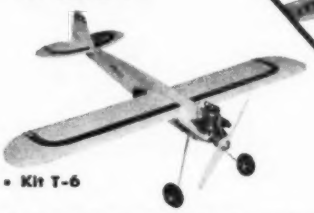

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- Kit P-4 Grumman Hellcat F6F
- Kit P-5 Lockheed Lightning P38
- Kit P-6 Rep. Thunderflash F84-F
- Kit P-7 Grumman Cougar F9F-6
- Kit P-8 Taylorcraft 54" Wingspan
- Kit P-9 Aeronca 54" Wingspan
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- Kit P-11 Douglas Skystreak
- Kit P-12 Sabre Jet F86D

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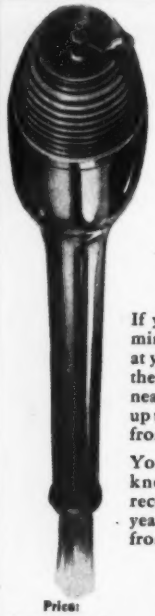

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the intake ports and bolted down onto a flange on the crankcase. The finned dural cylinder barrel is a sliding fit over the upper part of the liner, instead of the usual thread fitting, and is held down by two nuts screwing onto cylinder studs which are extended for this purpose. The motor runs well and, on test, produced a maximum of .22 hp at a peak speed slightly under 12,500 rpm.

New German Commercial RC

Johannes Graupner, whose range of *Taifun* engines is popular in Germany, now has an RC outfit in production. Known as the Standard 10, the equipment is for single-channel transmissions on 27.12 mc. Limited info so far released shows receiver to be a two-tube circuit. The transmitter is neatly cased and has built-in meter. END

Field Box

(*Continued from page 16*)

providing better stability on rough terrain. This feature also makes the box a good deal simpler to build.

A booster battery switch and panel jacks for connecting the leads are built into the front panel. While not absolutely necessary, this feature is a convenience that will help eliminate shorted batteries caused by clips resting on each other after starting and it saves a lot of wear and tear on battery cases and terminals.

Since many of us specialize in one particular phase of modeling, our needs for a tool box may vary. If this is your particular problem, we would like to stress the fact that this design is not so "cut and dried" that it can't be adapted to fit those specific requirements or modified to suit an individual's taste. Many of you, undoubtedly, will modify the design as you see fit and even improve it in so doing. For instance, some of the team racing addicts may want to add a pair of wheels at one end and a handle at the other, so the crew can operate more rapidly. Some of the RC enthusiasts may want to add legs and a detachable work table to bring it up to a less back-breaking height (recommended for youngsters over 35). These and countless other variations are possible and practical. To show all of the possibilities of a basic design like this would be impractical and beyond our design ability, to boot.

The physical dimensions of this box were governed by the need for ease of handling, compatible with a reasonable capacity. For these reasons we do not recommend changing the over-all size to any great extent. A box much larger than the one shown will be difficult to lug around and anything much smaller may be inadequate for the usual complement of tools and equipment.

Fir plywood, 1/4 and 3/8 in. thick, was chosen as the basic material for this project because of the ready availability and working ease it offers. Many of those who build this

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job will have enough scrap material of the correct size around the house, making a trip to the local lumber yard or hardware store unnecessary. We don't, however, recommend the destruction of any furniture or borrowing from pappy's private stock without his written permission! In the event that it becomes necessary to purchase all the materials, the total cost, including hardware, should be about four bucks. It's pretty tough to find a really good, ready-made box on the market for that price. A complete materials list is tacked on the end of this article, so refer to it before buying. Most good hardware stores now stock "Handy-Paks" of plywood in various thicknesses and types of wood and in sizes smaller than the 4 x 8 ft. standard and are recommended for this project. Check with your local dealer.

Actual construction of this project is quite simple. For this reason a minutely detailed, step-by-step procedure is not required. Full size drawings would prove to be of little value, either. Work should begin by tracing the outlines of the various parts on the correct sizes of wood and cutting to shape with a hand saw.

Begin the assembly of the box by joining the two ends and the front and rear. The bottom piece should be inserted and the handle slipped into place. All joints should be made with Weldwood glue (it's hot fuelproof) and No. 8 x 3/4 in. long steel or brass wood screws. Spot-drill holes for the wood screws using a 1/8 or 5/32 in. dia. drill. Reasonable care should be taken to insure that all parts are cut square and a square should be used when assembling. Partitions should be located as shown on the patterns for parts 2 and 3. Partitions should fit snugly between the sides and should be assembled in the same manner mentioned in the beginning of the paragraph.

The drawer should be assembled last, with all joints nailed and glued, again with Weldwood. Care again should be exercised to keep the drawer square to insure a smooth fit in the box. Locate the hasp position on the drawer front and also the box, with the drawer in place. Spot the position of the screws but do not install until the finishing operation is complete.

Drill the front panel to suit the boosterlead connectors and switch you have decided upon. We chose test lead plugs and jacks (available in most radio and TV repair shops) and an ordinary SPST toggle switch. The battery compartment cover, part 14, should be drilled for a single wood screw to permit easy access to the batteries.

The finish is important! A good, hot fuelproof enamel, such as Dulux or Red Devil, should be used. Prime the entire assembly first with two coats of flat white primer (Firzite sealer may be used also, but is not really necessary) and finish with at least two coats of enamel. Care should be taken to insure that the finish coats get into every crack and crevice. A tool box takes a terrific beating and a good finish increases the durability.

The drawer pulls and hasp should be added after finishing. It's a good bet to add your AMA number and name, using decals, to settle any possible arguments. If decals are used, give them a couple of coats of clear varnish to make them stay put.

Guess that's it, fellow. Lot's of luck and good flying!

Bill of Materials

1/4 in. plywood (ca. 2-1/2 sq. ft.); 3/8 in. plywood (ca. 6-1/2 sq. ft); 1 in. dia. dowel x 20-3/4 in. long; 1/2 in. sq. hardwood strip (ca. 5 ft.); 3/8 in. sq. hardwood strip (ca. 5 ft.); No. 8 x 3/4 in. long flat head steel wood screws (three dozen); drawer pulls (one pair); small hasp; padlock; toggle switch; test lead plugs and jacks (one pair each); paint and trim as required. END

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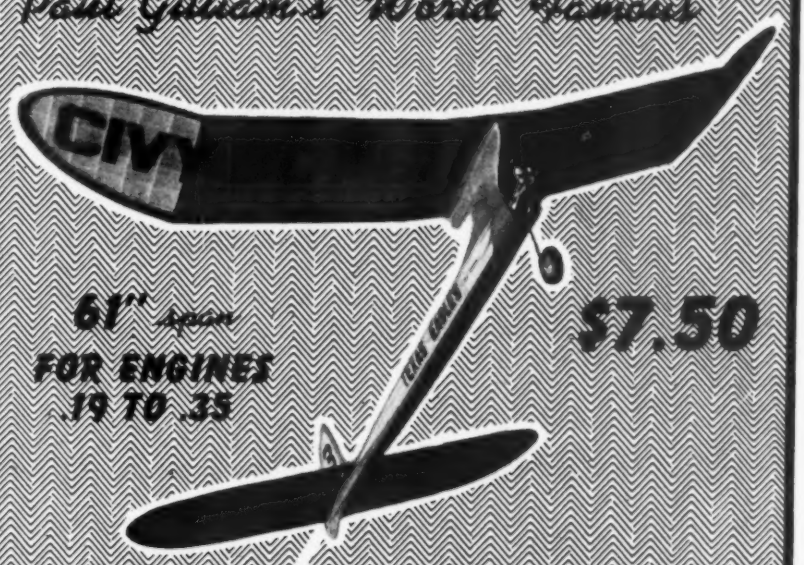

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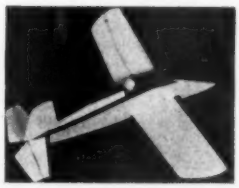

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Contest Calendar

APRIL

3—*Bakersfield, Calif.:* Class AA Bakersfield Annual Free Flight Meet for FFG. Francis Stewart, C.D., 900 21st St., Bakersfield, Calif.

10—*Ft. Worth, Tex.:* Cowtown Sahibs' Record Trials for all outdoor classes. Similar Record Trials also on May 8, June 12, July 10, Aug. 14, Sept. 11, Oct. 9, Nov. 13, Dec. 11. Ralph Tenny, C.D., 2409 Spiller, Ft. Worth, Tex.

10—*Santa Ynez, Calif.:* Class AA 1st Annual FAI Team Meet for FAI Power. Wm. J. Kaupp, Jr., C.D., 2733 Verde Vista Dr., Santa Barbara, Calif.

17—*Inglewood, Calif.:* Class AA Skywolves' Team Race. Similar meets also on June 12, July 10, Sept. 11, Nov. 13. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

24—*Fresno, Calif.:* Fresno Gas Model Record Trials for FFG. Similar Record Trials also on May 29, June 26, July 31, Aug. 28, Sept. 25, Oct. 30, Nov. 27, Dec. 26. Jim Scheidt, C.D., 2225 Brown Ave., Fresno, Calif.

24—*Chino, Calif.:* Class AA Olympic Contest for FAI Power, Wakefield, Nordic. Dick Everett, C.D., 13265 13th St., Chino, Calif.

30—*Kitty Hawk, N. C.:* Contact Carlton B. Garrett, P. O. Box 645, Elizabeth City, N. C. Pending.

MAY

1—*Tucson, Ariz.:* Class AAA 4th Annual Tucson Round-up for FFG, OR, TLG, OHLG, CLS, CL, combat, CLFS, RC. Charles R. Downs, C.D., 1035 E. 6th St., Tucson, Ariz.

8—*Santa Ynez, Calif.:* Class AA 3rd Annual Omnimeet for FFG, OR, TLG. Wm. J. Kaupp, Jr., C.D., 2733 Verde Vista, Santa Barbara, Calif.

15—*San Diego, Calif.:* Class AA San Diego Aeroneers' Annual PAA-Load Contest for PL, CC. George G. Wagner, Sr., C.D., 924 Evans Ave., Chula Vista, Calif.

21—*New York, N. Y.:* Class AAA 10th Annual Mirror Model Flying Fair for CL, combat, TR, CLS, NC, FFG, PL, RC, CLFS, beauty, CC, helicopter. Ted Clodius, C.D., New York Mirror, 235 E. 45th St., New York 17, N. Y.

21 & 22—*Moffett Field, Calif.:* Class AAA 1955 California Model Airplane Championships for IR, IHLG, FFG, OR, RC, CL, CLS, CLFS, TR. Harvey S. Robbers, Sr., C.D., 5610 E. 17th St., Oakland 21, Calif.

29—*Bristol, Pa.:* Class AA 5th Annual Flying Circus for NC, CLS, combat, TR, CLFS, OHLG. Albert E. Abrams, Jr., C.D., 1031 Pond St., Bristol, Pa.

30—*Galesburg, Ill.:* Class AA Memorial Day U-Control Contest for TR, CLFS, CL, combat. Kenneth W. Freese, C.D., 90 Olive St., Galesburg, Ill.

JUNE

4 & 5—*Goodland, Kan.:* Class AA Northwest Kansas Gashoppers' Meet for FFG, CLFS, CLS, combat, RC, CL. Kenneth Armstrong, C.D., Goodland, Kan.

4 & 5—*Nashville, Tenn.:* Class AA 4th Annual Model Aircraft Show. Carl V. Miller, C.D., 427 Deaderick St., Nashville, Tenn. Pending.

5—*Farmingdale, N. Y.:* Class AA 2nd Annual Long Island Industrial Championships for CL, CLS, combat, NC, beauty. Arthur F. Wardell, C.D., 2 Hunt Pl., Bethpage, N. Y.

5—*El Paso, Tex.:* Record Trials for FFG, OR, TLG, OHLG. Fred Lind, C.D., 1610 E. Yardell, El Paso, Tex.

5—*Fall River, Mass.:* Controlline Meet. David P. Turner, C.D., 422 S. Main St., Fall River, Mass. Pending.

5—*Chicago:* Class AA Chicago U-Liners' Annual Meet for combat. Edgar M. Holzbach, C.D., 14510 S. Union Ave., Chicago 27. Pending.

5—*Wilmington, Del.:* Class AA Meet. W. Lewis Knowles, C.D., 515 Shipley St., Wilmington, Del. Pending.

12—*Ft. Wayne, Ind.:* Mad Modelers' Meet. Walter A. Krull, C.D., 414 E. Washington Blvd., Ft. Wayne 2, Ind. Pending.

12—*Corning, N. Y.:* Class AA 2nd Annual Flying Sparks' Radio Control Meet. W. E. Bliss, C.D., 47 Corning Blvd., Corning, N. Y.

12—*Easton, Pa.:* Class AA Model Airplane Doctors' 3rd Annual Air Meet for FFG, combat, OR, CLS, RC, TLG, PL. Russ R. Sottosanti, C.D., 1113 Keane St., Easton, Pa. Pending.

12—*Hartford, Conn.:* Class AA Greater Hartford Spring Team Race. Richard Matava, C.D., 358 Prospect Ave., Hartford, Conn.

16-19—*Atlanta, Ga.:* Class AAA Greater Southeastern Model Airplane Contest for FFG, CL, OR, OHLG, CLS, CLFS, RC, TR, NC. Lloyd Wason, C.D., 315 Church St., Decatur, Ga.

19—*Long Island, N. Y.:* Class AA Skyscrapers' 11th Annual Free Flight Contest for FFG, OHLG, OR, TLG. Joseph Scuto, C.D., 7023 11th Ave., Brooklyn 28, N. Y. Pending.

26—*Kansas City, Mo.:* Class AAA 3rd Annual Controlline Contest for CLS, combat, CL, CLFS, TR. P. W. Asjes, C.D., 5313 Ralston, Kansas City 29, Mo. Pending.

26—*Mankato, Minn.:* Class AAA Mankato Exchange Club Model Airplane Meet for FFG, CL, CLS, TLG, combat, CLFS, TR, RC. William B. Thomas, C.D., Box 713, Lake Crystal, Minn.

26—*Detroit, Mich.:* Class AAA Annual Michigan State Exchange Clubs Model Airplane Meet for FFG, CL, OR, TLG, CLS, RC, PL. Entry is restricted to residents of state. Frank P. Sposite, C.D., 9900 E. Jefferson, Detroit 14, Mich.

26—*Long Island, N. Y.:* Class AAA Gas Monkeys' 8th Annual Long Island Championships for FFG, Jetex, OR, RC. Edwin W. Howe, C.D., 5 Camdike St., Valley Stream, N. Y. Pending.

JULY

2 & 3—*Ellington AFB, Tex.:* Class AAA Meet for FFG, CLS, combat, CL, PL. Robert R. Osburn, C.D., 902 17th Ave., N., Texas City, Tex. Pending.

3—*Chicago:* Class AA 3rd Annual Chicago Prop Nutz Flying Meet for FFG, OHLG, TLG, OR. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29, Ill.

10—*Joliet, Ill.:* Exchange Club of Joliet Flying Circus. Glenn F. Stearman, C.D., 604 Abe St., Joliet, Ill. Pending.

10—*Lancaster, O.:* Paul McGrew, C.D., 331 E. Main St., Lancaster, O. Pending.

10—*Pittsfield, Mass.:* Class AA 4th Annual Berkshire Model Plane Contest for CLS, combat, TR. Robert L. Elliott, C.D., 48 Curtis Terr., Pittsfield, Mass.

11-16—*Travis AFB, Calif.:* Air Force World Wide Model Airplane Contest.

17—*Hartford, Conn.:* Class AA Insurance City Team Racing Meet. Charles J. Gallagher, C.D., 47 Church St., East Hartford, Conn.

18-24—*Los Alamitos, Calif.:* Class AAAA National Championship Model Airplane Contest.

AUGUST

7—*DeKalb, Ill.:* Class AAA DeKalb Cloud Dusters Flying Circus for FFG, OR, RC. Dutch Hess and Dale Hindenburg, C.D.'s, 137-1/2 E. Lincoln, DeKalb, Ill.

7—*Frederick, Md.:* Class AA Exchange Club of Frederick 2nd Annual Model Airplane Contest for FFG, CL, CLS, combat, TR, CLFS, RC. Everett E. Champlin, C.D., 1002 Rosemont Ave., Frederick, Md. Pending.

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28—*Pennsylvania:* Class AAA Pennsylvania State Exchange Approved Meet. Pending.

SEPTEMBER

5—*Far Hills, N. J.:* Class AA Bedminster-Far Hills Lions Club Model Air Meet for CL, CLS, beauty, TR, combat. C. Marsden Vanderwaart, C.D., Lamington Rd., Bedminster, N. J.

5—*Lancaster, O.:* Paul McGrew, C.D., 331 E. Main St., Lancaster, O. Pending.

10—*El Paso, Tex.:* Record Trials for FFG, OR, TLG, OHLG. Fred Lind, C.D., 1610 E. Yardell, El Paso, Tex.

11—*Hartford, Conn.:* Class AA Greater Hartford Autumn Team Racing Meet. Robert H. Haines, C.D., 75 Evergreen Ave., Hartford, Conn.

18—*Buffalo, N. Y.:* Flying Bisons 3rd Annual Meet. Pending.

After You, Alphonse

(*Continued from page 24*)

but square rubber was used by early modelers around 1900 to 1910, so perhaps he too used this kind. Considering the fact that it was the year 1870, his simple rubber powered helicopters were not bad at all. He built them in different sizes of the lightest materials then available, bamboo and soft pine being used with strong tissue and very light silk.

He was able to make them hover for 15 to 20 seconds and had circular helicopter flights up to 26 seconds. He did this by careful adjustment of the rotor vanes, even as is done today. Like the world's first rubber powered model airplane, which he designed in 1871, these rotor vanes were very flexible and quite similar in shape to the wing and tail of his 1871 Planophore.

Penaud soon realized the practical limitations of the helicopter models and turned to the fixed wing aircraft idea as a possible means of human flight. Early in 1871 he brought out the first of the Planophore series, as he called them, which were single propeller pushers or Canards. Now you can poke fun at them if you wish, but these models flew very well and set a basic design still used today.

Let's see what the world's first rubber driven model airplane was like. This No. One flier only weighed 0.56 oz. and carried 0.17 oz. of rubber. Its main aeroplane, as he called the wing, had an area of 0.53 sq. ft. and had a 4 in. chord at the center of its 18 in. span. Its propeller was 8 in. in diameter and of very light construction. It was a light framework covered with paper and paddle shaped, as were some propellers of a later date. The Planophore had no "cans" for bracing the fuselage or motor stick against the force of the rubber, nor did Alphonse swipe his mother's egg beater for a winder. These items came later—much later.

The wing was set at a slight angle of incidence and had a form of elliptical dihedral, with the wing tips higher than the center of the wing. The center of gravity was just behind the leading edge of the wing and slightly in front of the center of pressure or highest curvature of the wing section. The flexibility of the wing and tail caused the machine to fly in a series of slight ascents and descents, resembling the darting flight of a sparrow. In calm air, its speed was 12 ft. per second on 240 turns of the rubber and it would average a distance of 131 ft. in 11 seconds. Penaud demonstrated his little flier in August, 1871 before a group of members of the French Society of Aerial Navigation in the garden of the Tuileries, and won acclaim for the performance. He used a fin on the tail, but no drawings of the fin-equipped model ever were turned up.

Now before you pooh-pooh this 131 ft.

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☐ **GYRATOR:** .29 - .35 stunter.
AERONUT: .19 free flight.

☐ **BOUNDER:** Record .29 speed.
ZEPHYR: .049 free flight.

☐ **NOBLER:** Aldrich .29 stunt.
FUNSTER: Hot .049 free flight.

☐ **SKY WING:** .049 flying wing.
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flight, and wonder what kind of "hardware" he took home for it, just remember this: very few models could fly over 100 ft. up to the year 1909! It was not until such early model stars as Art Heinrich, George Page, Cecil Peoli and others hit their stride in 1910 and 1911 that real progress was made. While Penaud never lost a model in flight, he knew about "risers" or thermals and stated that they could aid the flight of man-carrying gliders with the proper handling of such craft. While Penaud made more Planophores and improved them progressively, he tried an ornithopter model which flew very well. It never flew as well, however, as the helicopters and Planophores did. His keen brain was ever reaching out for new things to aid in the conquest of the air, and he invented a plane table for plotting the course of balloons, a sensitive barometer, a balloon valve, a tailless kite, and other devices as well.

In 1876 he teamed up with a fellow countryman named M. Gauchot, and the two men patented a design for a two man aeroplane that certainly is the ancestor of the flying wing. It had the world's first retractable landing gear to reduce air resistance. It had two propellers in front, one on each side of the wing; a well streamlined car enclosing the pilots; and an automatic tail designed to give ample fore and aft balance. The thin elliptical wing was to be braced top and bottom with wires from a short mast above and below the car or cabin. It was to have a moderate dihedral angle, flexible tips and a flexible center. To this flexible center was to be hinged the automatic tail. The head of the pilot was to be protected from the wind by a "glass box" which was truly the world's first airplane wind shield. Now as fine as all this was, the inventors were stumped by one very important need.

This was an engine light and powerful enough to fly it. Neither Penaud or Gauchot realized the need of the correct values of lift and drag that were not to be found until the winter of 1902 by the Wright Brothers' wind tunnel test. After a fruitless search for an engine, Penaud proposed a light steam engine which could not be built to his calculations and he and his friend Gauchot became very discouraged. Penaud had made a very rough landing with others in a balloon flight in which he tested some of his aerial instruments and this aggravated his old ailment. After a series of setbacks caused by lack of money, his health failed rapidly, and poor Penaud, losing all hope in 1880, shot and killed himself before his thirtieth birthday. Gauchot also lost heart, but his story fades with Penaud, and his final days are lost to history.

The writer has built and flown several Penauds and it is a lot of fun to watch their performance. Both indoor and outdoor light and medium heavy types were flown, and one indoor job would turn in flights of one minute or over. It was, of course, light balsa which Penaud never heard of. So, if you are looking for something different to try out, why not a sort of flying toast to a great guy, Alphonse Penaud, the father of model aviation and a great pioneer? END

Flash News

(*Continued from page 6*)

automatic directional stability, making it just about impossible to get into the dive that killed 66 lightplane pilots in 1953.

Making a good bomber—the B-47 jets—better is Air Force's goal in a $250-million modernization program for 1,000 of them. Here's what's being done to them: white paint on the underbelly to protect from radiation after a nuclear blast; a better bombsight; new noses with downward automatic ejection seats for navigator; a new jato system, water injection for quicker take-off, approach chutes to slow the bomber on landing, and drag chutes that open after wheels touch down.

Russia's air progress has not surpassed that of the U. S. But it is beginning seriously to challenge it. That's the view of the National Advisory Committee for Aeronautics. It wants aircraft that are nuclear powered; able to fly supersonically to any point in the world and return. The turbojet progress is spectacular (sixfold increase in thrust), but still not enough for tactical military aircraft. NACA feels the U. S. will not be far enough ahead of Russia until American tactical planes fly at 2,000 mph.

Defense leaders are alarmed over the shortages of scientists and engineers, particularly in aviation. This is pointed up even more so when it is realized the U. S. is putting its stakes on quality: effective—not just more—airpower. But, since 1950, the number of engineering graduates keeps declining—from 50,000 to 19,000 last year. Russia's figures (from Intelligence sources) are just the reverse and could surpass the U. S. in this field by 1960.

Mobile sea bases for a nuclear war are getting serious attention right up to the White House. The idea, the Navy's, is to have small task forces (made up of carrier units, atomic subs, new type nuclear powered destroyers, etc.) spread out over an area the size of Maine. They'd launch guided missiles, rockets with atomic warheads, planes for bombing. But an enemy would have a difficult time finding and knocking them out in contrast to fixed bases. Moreover, an enemy trying to find and knock out such mobile bases wouldn't have so much time to drop nuclear bombs on heavily populated areas. END

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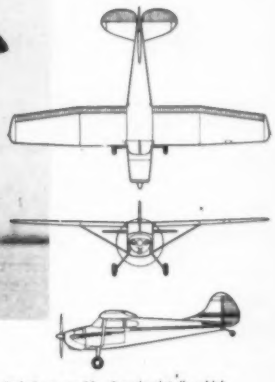
- Selected Strip Balsa
- Pre-Fabricated Wing Edges



Berkeley's

CESSNA "170"

Designed by: Henry Struck

$10.95

For Radio Control — Free-Flight — PAA-Load

For .25 to .35 Engines — 72" Span — 2" Scale

Controlling your "170" by Radio is a thrill you will never forget! Perfect scale, rugged, stable in all attitudes, yet responsive in control with good wind penetration qualities. Gear location is ideal for extended take-off runs, while its larger size makes it less sensitive to turbulent air. A large cabin makes extra radio installations easy.

The plans include a wealth of scale details which will appeal to the master craftsman. Inexperienced builders will find construction simplified by the full size plans, sketches and assembly technique.

Inspect the "170" and its many features at your dealer. Study its design, examine the material, and visualize its performance on the contest field.

R.C. AMPHIBIAN...

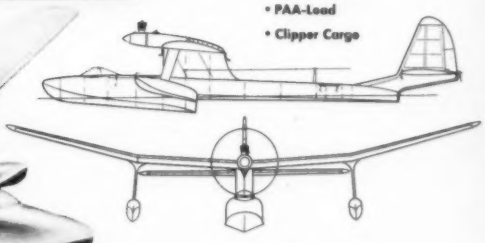
Fly it Five Ways:

- Seaplane (R.O.W.)
- Amphibian (R.O.G.)
- Radio Control
- PAA-Load
- Clipper Cargo

Fly it on Ponds – Rivers – Bays – Lakes or Flying Fields!

- Detailed Full Size Plans
- Shaped Leading, Trailing Edges
- Die-Cut Balsa and Plywood
- Celluloid Bubble Canopy
- Metal Ring Cowl
- Hardware, Covering Material
- Selected Strip Balsa

$7.95



Henry Struck's **"SEA-CAT"**

N.A.C.A. Type Planing Hull Amphibian

For .15 to .25 Engines — 68" Wingspan

First All-Purpose Gas Model

Here is a model design that has been a full thirteen years in development. It's N. A. C. A. Planing Hull design makes water take-offs easy. Its hull is easily accessible for radio control equipment, PAA Dummy Pilot or Clipper Cargo.

Proven performance on the original test models include: First International Radio Control Flight; Fourth place in a field of seventy in the Mirror Flying Fair (The first R.C. contest for both Struck and the "Sea-Cat"); First in Radio Control at Screamin' Demons Long Island Sound Hydro Championship; Second in PAA-Load at the same contest; and Precision flights carrying over a pint of fuel at the First "World Model Air Olympics."

NEVER ANYTHING LIKE IT... A 32" FORMED PLASTIC HULL!

Chris-Craft

RADIO CONTROL OPTIONAL!

1" = 1' Scale — 32" Overall

"32' CRUISER"

For up to a .29 Gas Engine or two Miniature Electric Motors.

At your Dealers or via Railway Express Collect.

$14.95

- 32" High Impact Vacuum Formed Plastic Hull
- Formed Plastic Cabin with Mahogany Overlay
- Full Size Plans, R.C. Installation Details
- Cast Marine Deck Fittings, Authentic Decals

Destined to change all concepts of model boat construction with its formed plastic hull and cabin, is this masterful reproduction of the ever-popular 32 foot Chris Craft Cruiser. Gone are planking and leakage worries, gone are long hours of hull construction and alignment, time which you can spend to better advantage installing radio control devices or in adding interior decorations. Gleaming white hull, trimmed

"GIANT" FLYING SCALE

Only $8.95

Berkeley's

Radio Control — Free-Flight — PAA-Load

"PIPER CUB J-3"

- Full Size Plans with R.C. Installation Details
- Authentic Decals
- Die-Cut Balsa Parts
- Die-Cut Plywood
- Tapered Trailing Edges
- Hardware as Required
- Die-Cut Celluloid

The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it is a natural for the R.C. or Free-Flight flyer. Almost six feet in span, perfect for those extra R.C. installations you've been dreaming about. It's a rugged, high performing, thoroughly flight proven scale design.

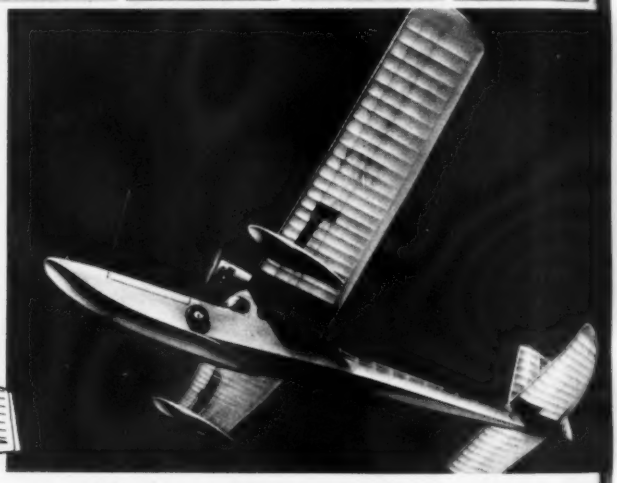
For .15 to .25 Engines—71" Span—2" Scale

Weight: 4½ lbs. — 700 Sq. In. Wing Area — 14.2 oz. Loading

- Shock Mounted Wing Panels
- Rudder-Motor Control
- Fully Detailed, Authentic
- Optional Elevator Trim

Perfect for aerial photography, endurance flights, distance flying across open water, etc.

- Full Size Plans with R.C. Installation Details
- Metal Ring Cowl
- Die-Cut Balsa Parts
- Die-Cut Plywood
- Tapered Trailing Edges
- Pre-Fabricated Blocks
- Hardwood as Required
- Selected Sheet and Strip
- Genuine Silkspan
- Die-Cut Celluloid



GIANT AMPHIBIOUS N.A.C.A. "LONG PLANING HULL" FLYING BOAT

Dan McGovern's "CUSTOM PRIVATEER"

- 15-1 Length Beam Ratio N.A.C.A. Long Planing Hull
- 100% Watertight R.C. Compartments
- Forward Hull R.C. Hatch
- Shock Mounted Wing Floats
- High-Medium-Low Speed Motor Control
- Rudder, Water Rudder, Elevator Trim
- Can Carry Several Pounds Payload

For Radio Control — Free-Flight

The "Custom Privateer" is a huge N.A.C.A. Long Planing Hull Flying Boat design. Water take-offs with a screaming ".60" draw a crowd everytime. In seconds it is a speck in the sky, wheeling to your command. Throttle back and shoot power-on landings, taxi back to beach or boat. Test flown for two years, it has never dunked, even on white-capped open water. Standard gallon can fits under C.G. in cargo area. Design can lift several pounds of extra payload. Wing transports externally on car top racks. Easy to build, and recommended for novice R.C. flyers, as it is not critical in flight.

For .45 to 1.20 Engines — 114" Wingspan (9½ Feet)
Weight with R.C. — 9½ lbs. (15.2 oz. Loading)
1440 Sq. In. Wing Area

Pre-Fabricated Kit:

$19.95

Designed by: **Woody Blanchard**
—1954 National High Point Champ.

This is an improved version of Woody Blanchard's Nationals' winning design. An extremely easy to build model, it is a potential winner at every contest. You can't go wrong with this PAA-Load.

Free-Flight — PAA-Load

"PAYEE"

"America" Class PAA-Load Design
For .049 Engines — 50" Wingspan

$2.95

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For years ALLYN and K & B, best known respectively for the FURY and TORPEDO engines, have each maintained a high standard of tooling and engineering which has made them leaders in the model line. With the same top management of each company behind it the K & B Allyn Company will remain the same in policy and aim. The demand for precision detail, the best in performance, and the use of top quality materials remains unchanged. Their constant research and advanced designing has produced many "firsts" and will continue to do so! This pooling of talents and vast experience will open up for you, the modeler, a new vista of things to come as well as now offering you the largest and most stable line in the field!

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- **Model marine engines**
- **Plastic plane kits**
- **Plastic boat kits**
- **Supersonic Fuels**
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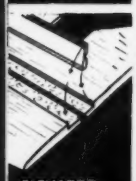
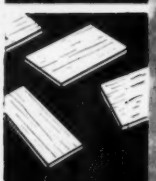
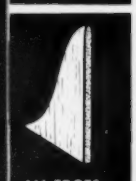
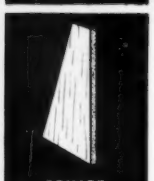
WING TIPS ROUNDED	SQUARE, UNFINISHED
 ELEVATOR HINGES PREFORMED	 LOOSE PARTS
FUSELAGE AND WING INTERLOCK	GLUED ONLY
 ALL EDGES ANDED SMOOTH	 SQUARE, UNFINISHED
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ENGINE: .29 to .35
SPAN: 43 inches

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Boy, it's sharp! Here, at last, is a plane that was conceived and engineered to do every stunt with "hair-trigger" precision . . . does outside loops with ease, vertical and overhead 8's with masterful finesse! For stunting, precision and combat flying, you'll have more fun with a "Firecat"!

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